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THE POTATO-BREEDING PROGRAM, USA, 1972

By
Raymon E. Webb and Others
and
State Cooperators

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TABLE OF CONTENTS

	<u>Page</u>
UNITED STATES DEPARTMENT OF AGRICULTURE:	
Agricultural Research Center, Beltsville, Md., and Chapman and Aroostook Farms, Presque Isle, Maine -----	1
By R. E. Webb, USDA, Beltsville, Md.; David Wilson, Presque Isle, Maine; and James Frank, Orono, Maine	
True seed, clonal stocks, varieties, and germplasm distribution -----	1
Chapman Farm -----	4
Aroostook Farm -----	4
Disease Resistance Evaluations -----	15
By James Frank, David Wilson, and R. E. Webb	
Verticillium wilt resistance -----	15
Late blight -----	15
Early blight -----	16
Common scab -----	16
Inter-Regional Potato Introduction Project -----	24
By P. R. Rowe and R. W. Ross, Wisc. Agr. Exp. Sta., Madison, Wisc.	
North Central Regional Trial -----	26
By R. H. Johansen, N.D. Agr. Exp. Sta., Fargo, N.D., and Cooperators	
Environmental conditions -----	26
Cultural practices -----	26
Entries -----	27
Yield -----	27
Maturity -----	27
Total solids -----	27
Scab reactions -----	27
Internal and external defects -----	27
Overall merit ratings -----	27
Chip quality -----	27
ALABAMA -----	36
By J. L. Turner, Harrison Bryce and Hubert Harris, Ala. Agr. Exp. Sta., Auburn, Ala.; Frank E. Garrett, Gulf Coast Substation, Fairhope, Ala.; S. E. Gissendanner and John Eason, Sand Mountain Substation	
ALASKA -----	39
By Curtis H. Dearborn, Univ. of Alaska, Palmer, Alaska	
CALIFORNIA -----	41
By R. E. Voss, J. C. Bishop, K. G. Baghott, D. N. Wright, and W. A. Wright	
COLORADO -----	48
By James A. Twomey, San Luis Valley Branch Sta., Center, Colo.	

	<u>Page</u>
CONNECTICUT -----	51
By Arthur Hawkins, Univ. of Connecticut	
DELAWARE -----	54
By R. F. Stevens, Francis Webb and Roger Ginder	
FLORIDA -----	57
By J. R. Shumaker	
Variety and seedling trials -----	57
By D. P. Weingartner and J. R. Shumaker	
Corky Ringspot Resistance -----	62
PACIFIC NORTHWEST (IDAHO) -----	65
By J. J. Pavsek and D. R. Douglas	
MAINE -----	70
By D. C. Merriam and F. E. Manzer	
Ring rot resistance -----	70
Spindle tuber resistance -----	71
By Hugh J. Murphy and Michael J. Goven -----	72
MICHIGAN -----	78
By N. R. Thompson and R. W. Chase, Univ. of Mich. Agr. Exp. Sta., East Lansing, Mich.	
MINNESOTA -----	83
By F. I. Lauer, O. C. Turnquist, E. B. Radcliffe and C. J. Eide, Minn. Agr. Exp. Sta., St. Paul, Minn.	
MISSISSIPPI -----	88
By James M. Cannon and Gale R. Ammerman	
NEW JERSEY -----	95
By C. E. Cunningham, F. L. Merwarth, T. E. Snyder, and G. S. McWalter, Campbell Institute for Agricultural Research	
By Melvin R. Henninger -----	106

	<u>Page</u>
NEW YORK -----	109
By R. E. Anderson, B. B. Brodie and M. B. Harrison	
By B. B. Brodie -----	110
By R. C. Cetas, Long Island Veg. Res. Farm, Riverhead, N.Y. -----	112
By S. Dallyn, P. Schippers and D. Fricke, Long Island Veg. Res. Farm, Riverhead, N.Y. -----	122
By R. L. Plaisted and H. D. Thurston, Cornell Agr. Exp. Sta., Ithaca, N.Y. -----	128
By Joseph B. Sieczka -----	140
NORTH CAROLINA -----	149
By F. L. Haynes	
NORTH DAKOTA -----	154
By R. H. Johansen and J. E. Huguelet, N.D. Agr. Exp. Sta., Fargo, N.D.	
OHIO -----	164
By Floyd Lower, A. R. Mosley and E. C. Wittmeyer	
By J. P. Slesman and L. L. Sanford -----	168
PENNSYLVANIA -----	172
By Clarence S. Bryner, Pa. Agr. Exp. Sta., Univ. Park, Pa.	
By J. D. Harrington, F. J. McArdle and R. B. Beelman -----	175
SOUTH CAROLINA -----	182
By W. R. Sitterly, Agr. Exp. Sta., Charleston, S.C.	
TEXAS -----	184
By R. D. Peel, S. B. Norrell, Paris, Texas; and C. E. Cunningham, Riverton, N.J.	
By B. A. Perry, M. C. Fuqua, Texas Agr. Exp. Sta., College Sta., Texas; and R. E. Webb, USDA, Beltsville, Md. -----	190
VERMONT -----	194
By S. C. Wiggans, W. R. Kelly, R. N. Jensen, Montpelier, Vt.; and H. J. Murphy, Univ. of Maine, Orono, Maine	

	<u>Page</u>
VIRGINIA -----	198
By Boyett Graves, Virginia Truck Exp. Sta., Eastern Shore Branch	
WASHINGTON -----	201
By William G. Hoyman, Irrigation Exp. Sta., Prosser, Washington	
By N. Holstad, R. Kunkel, and R. C. Holland, Agr. Exp. Sta., Pullman, Washington -----	213
WEST VIRGINIA -----	216
By R. J. Young, Univ. of West Virginia, Morgantown, W. Virginia; and K. L. Deahl, USDA, Beltsville, Md.	
WISCONSIN -----	222
By P. R. Rowe and R. W. Ruhde	
WYOMING -----	224
By K. E. Bohnenblust, Agr. Exp. Sta., Laramie, Wyoming	

AGRICULTURAL RESEARCH CENTER-WEST (BELTSVILLE, MARYLAND) AND
CHAPMAN AND AROOSTOOK FARMS (PRESQUE ISLE, MAINE)

R. E. Webb, David R. Wilson, and James A. Frank

True Seed, Clonal Stocks, Varieties, and Germplasm Distribution

Summaries of true seed, seedling tubers, clonal lines, and named varieties furnished cooperating States and industry and foreign countries are given in Tables 1, 2, and 3. Most of the stocks sent to cooperating States were intended for adaptability studies and suitability for specific uses according to seasonal market preference (fresh market, processed products, storage, etc.). Seedlings from specific parental combinations were furnished to six cooperators for selection under their local environmental conditions. Parental stocks possessing specific characteristics (pest resistance, excellent processing quality, russet skin, etc.) were made available to several breeders. Stocks from parents segregating for resistance to ring rot, brown rot, leafhoppers, and the Northern root-knot and golden nematodes were sent to cooperators for resistance evaluation purposes.

Varieties and clones sent to foreign countries were for breeding purposes, adaptability studies, foundation stocks to begin in-country certified programs and/or evaluation for resistance to specific diseases such as brown rot, early blight, and late blight and the golden nematode. True seed of specific parental stocks were sent to Uganda for selection of seedlings for multigenic resistance to late blight and resistance to brown rot.

Table 1. Distribution of first-year seedling tubers and true seed of selected parental combinations in the U.S. from ARC-West, Beltsville, Maryland--1972

Location	Cooperator	Progeny No.	Seedling No.	Seed No.
Alaska	Curtis Dearborn	15	2,237	
Colorado	James Twomey	26	3,384	
Idaho	Joseph Pavsek	22	2,495	
Kansas	Thomas Wagner	16	2,164	
Maine	David Wilson	247	43,000	
North Carolina	Frank Haynes	29	4,363	
North Carolina	Frank Haynes	22		10,200
Wisconsin	Roger Rowe	7	485	
Totals		384	58,128	10,200

Table 2. Distribution of varieties and advanced selections to cooperating States--19

State	Cooperator	Varieties No.	Selections No.
Alabama	J. L. Turner	3	22
Alaska	C. H. Dearborn		77
California	R. E. Voss		26
Delaware	Robert Stevens	2	23
Florida	James Shumaker	16	108
	D. P. Weingartner	2	7
Hawaii	J. Henri	10	
Idaho	M. D. Groskopp	2	4
	Joseph Pavcek		100
Kansas	Thomas Wagner	50	35
Louisiana	James Fontenot		28
Maine	F. R. Holbrook		27
	Frank Manzer		18
	Robert Akeley		78
Ohio	J. P. Slesman (Lind Sanford)		65
Maryland	H. Heggstad		58
	Lind Sanford	1	8
	K. Deahl		60
Mississippi	James Cannon	6	13
Minnesota	Orrin Turnquist		6
New Jersey	M. R. Henninger	25	93
New York	J. B. Sieczka	5	4
	Robert Cetas		19
	D. H. Fricke		14
	William Brodie		23
	R. L. Plaisted		18
	(parental stocks)		
	M. D. Harrison		135
	(golden nematode evaluation)		
North Dakota	Robert Johansen		50
Ohio	C. A. John	2	
	Floyd Lower	1	5
Pennsylvania	J. D. Harrington		4
	Jim Watts	1	59
Rhode Island	Albert Griffiths		3
South Carolina	Wayne Sitterly	4	32
Texas	Bruce Perry	1	53
Virginia	Boyett Graves		50
Washington	Robert Kunkel		10
	William Hoyman		76
Wisconsin	Melvin Rominsky		52
	Donald Kichefski		3
	(parents)		
Totals		131	1,466

Table 3. Varieties, clones, seedling tubers, and true seed sent to foreign countries

Country	Cooperator	Number of			
		Varieties	Clones	Seedling tubers	True seed
Afghanistan	Charles Duncan USAID	11	10	1,046	
Australia	H. Hyland	1			
Brazil	H. Hyland	1			
Bulgaria	H. Hyland	3	2		
Costa Rica	J. C. Iverson	10			
	M. A. Seligson	4			
El Salvador	Damon Boynton	6			
	K. Laurent	3	9		
Germany	H. Hyland	11	1		
Guatemala	J. S. Courand	2			
Hungary	Nat. Inst. Agrobotany	8			
Israel	M. Susnoski		5		
Netherlands	H. T. Wiersema		6		
New Zealand	A. S. Bedi		14		
Nigeria	Richard Wurster				10,300
Spain	P. de la Hera	33	62		
South Africa	J. J. du Toit	2	50		
South Vietnam	S. C. Litzenberger	10			
Thailand	H. Hyland	12			
USSR	N. I. Vavilov Inst.	10			
Venezuela	Jose A. Gonzales	2	27		
Totals		129	186	1,046	10,300

CHAPMAN FARM

Approximately 43,000 seedlings, representing 251 parental combinations from Beltsville, were planted on Chapman Farm. From these, about 900 selections were made for observation in 12-hill lots in 1973.

Eleven hundred and sixty-five selections were grown in 12-hill lots for preliminary evaluation for tuber type, productivity, and specific gravity. Two hundred and forty-eight selections from the 1971 12-hill plots were increased for distribution to cooperators, included in preliminary yield trials, and evaluated for processing quality. Most of these were included in one or more of the disease evaluation trials conducted on Aroostook Farm. Approximately 400 additional clones were increased for tests by cooperators, used as breeding stocks, and as foundation seed for yield and other trials conducted on Aroostook Farm.

AROOSTOOK FARM

Experimental design for all yield tests was a randomized block with four replications. All plots received 800 pounds of 15-15-15 fertilizer banded in 36-inch rows by a two-row planter. Clones to be tested were hand planted in 16-hill rows with 9-inch spacing. A 14-inch seed spacing was used in the russet yield trial. Cultural methods and materials for weed, insect, and disease control were according to local recommendations. Rainfall and temperature during the season are given in Table 4. Temperatures were near normal throughout the growing and harvesting season, and rainfall was adequate. At harvest all entries were graded and samples hand selected for specific gravity and quality evaluations. Specific gravity was determined by the air and water method. After specific gravities were determined, the samples were divided and placed in 50° F and 40° F storage at 90 percent relative humidity.

Samples were fried after 4 months of storage. One set of samples from the advanced yield trials stored at 40° F were reconditioned for 2 weeks prior to frying. Potato chips were made from each sample by cutting the tubers in half and taking a 1/16-inch thick slice from each tuber with a rotary food slicer. Slices were rinsed in water and placed on paper towels to remove excess water. Chips were then fried at 340° F in Primex vegetable shortening until bubbling ceased.

A french fry plug 3/8-inch in diameter was cut from each half of the tubers in the sample. After plugs were trimmed, rinsed, and excess water removed, they were fried at 365° F in Primex shortening for 5 minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1 = very light to 10 = very dark. French fry classes ranged from 1 = very light to 5 = very dark. Weighted averages were calculated by multiplying the number of chips or fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made using the PCII reference color chart 1206-U.

After color classification, each french fry plug was broken open and internal texture classified as 1 = mealy, 2 = intermediate, or 3 = salvey and a weighted texture index calculated.

Table 4. Weather data, Aroostook Farm, Presque Isle, Maine, May-October--1972

Date	High	Low	Precipitation	Total to date
5-15/5-21	69	50	.83	2.12
5-22/5-28	74	40	T	2.12
5-29/6-4	77	56	3.02	5.14
6-5/6-11	64	45	1.58	6.72
6-12/6-18	77	51	.48	7.20
6-19/6-25	76	58	1.35	8.55
6-26/7-2	76	54	.13	8.68
7-3/7-9	73	48	2.02	10.70
7-10/7-16	83	62	.82	11.52
7-17/7-23	76	56	1.29	12.81
7-24/7-30	73	52	.10	12.91
7-31/8-6	73	48	.43	13.34
8-7/8-13	72	53	1.27	14.61
8-14/8-20	72	45	.69	15.30
8-21/8-27	78	54	.87	16.17
8-28/9-3	77	55	.12	16.29
9-4/9-10	66	50	2.70	18.99
9-11/9-17	68	45	.31	19.30
9-18/9-24	65	37	T	19.30
9-25/10-1	64	44	.94	20.24

Early and Medium-Early Advanced Yield Trials. Sixteen clones and three varieties were included in the trial (Table 5). Planting was done May 20, vines killed August 29, and harvest was September 8. No clones significantly outyielded Cobbler, and 10 clones and the varieties Cherokee and Monona yielded significantly less than Cobbler. Lines B6535-10, B6595-12, B6708-1, B6928-8, B6929-10, B6951-1, and B6968-3 were selected as medium-early clones during the relatively dry season of 1971 and perhaps would have performed better in the medium-maturity trial. Tuber conformation of all clones except B6535-10 and B6731-2 equalled or exceeded that of the three check varieties. Specific gravity of clones and varieties were somewhat lower than in 1971. Lines B6535-10 and B6731-2 will be discarded because of low specific gravity and B6558-16, B6595-12, B6692-5, and B6952-3 will be dropped because of high tuber glycoalkaloids.

Advanced medium maturity yield trial. Twenty-four clones and five varieties were included in the trial (Table 6). Planting was done May 21, vines killed September 11, and harvest was done September 19. Yields were somewhat higher and specific gravities were lower than in 1971. Entries B6376-6 and B6705-10 performed as medium-early types and B6532-2, B6928-18, B6930-6, B6955-17 and Norchip responded as late-maturing clones during 1972. Within specific gravity groups only B6936-9, B6951-5 yielded considerably less than the low specific gravity variety Alamo. Clones B6936-9, B6951-5 and B6955-17 were significantly lower yielding than Superior but were similar in yields to Seminole. Of this group of clones, B6987-56 appears to have the wider range of adaptability and constancy in processing quality. It is resistant to virus X, common race of late blight and race A of the golden nematode.

Advanced late-maturity yield trial. Forty-five clones and four varieties were included in the trial (Table 7). Planting was done May 22, vines killed September 19 and harvest was completed September 28 and 29. Sixteen clones were lower in yield than Katahdin, but only five entries were significantly lower in specific gravity. Lines B6930-1, B6952-3, B6955-33, B6955-35, B7001-18 and B7013-4 appeared too late for a 120-day growing season. Lines B6814-16, B6815-19, B6952-3, B7024-7, B7024-17, B7033-24 and B7033-26 proved high in tuber glycoalkaloids and will be dropped from the program.

Yields of selected russet clones. Seventy-eight russet clones, Norgold Russet and Russet Burbank were included in the russet yield trial. Tuber russetting was of a heavy, coarse type in most clones in 1972. Consequently, only those showing acceptable tuber russetting are shown in Table 8. The earliest clone, B7147-6, and a late clone, B7147-8, yielded significantly less marketable tubers (2 in. min.) than either Norgold Russet or Russet Burbank. Only B7147-10 significantly outyielded the two check varieties. Lines B7147-6, B7196-1, and B7196-23 sized tubers earlier than Norgold Russet and equaled or exceeded that variety in specific gravity. Tuber conformation of all clones exceeded that of Russet Burbank, and only B7196-20 and B7196-37 were less attractive than Norgold Russet.

Chip and french fry yield trials. This trial was conducted primarily to determine the yield and maturity relationships among stocks with high specific gravity and promising processing quality during the 1972 growing season. Kennebec, Norchip and Superior, all popular processing types, were included as a base from which high-quality parental stocks might be selected. Excessive rainfall during June damaged the planting and a moist period, prior to and at harvest, favored lower specific gravities (Table 9) than shown by most entries following the 1971 harvest.

Yields of clones resistant to race A of the golden nematode. Clones shown in Table 10 are assembled in tabular form from preliminary yield trials of early, medium, and late clones showing some promise in 1971. The preliminary yield trials are not shown in this report. With few exceptions (B7152-3, B7154-6, B7155-56), yields were similar to that of Katahdin and a number appeared to significantly outyield that variety. In general, specific gravity was lower than hoped for in these stocks. There were notable exceptions. Lines B7151-4, B7151-6, B7151-7, and B7151-9 were highly acceptable in specific gravity. These clones also are quite acceptable in yield and maturity.

Clones with potential for starch production. Some interest has been shown in the production of starch from potatoes, particularly in the Western United States. In 1971 cooperative with Colorado, preliminary adaptability trials were conducted with a number of clones with relatively high specific gravity when grown in Maine. Most did not yield well in Colorado. Additional high specific gravity clones were evaluated at Presque Isle, Maine, in 1972 for their potential adaptability to starch production (Table 11). Kennebec, a widely adapted, high-yielding variety with a moderate level of specific gravity, was used as a comparison. Table 10 shows the results of the trial. Only five clones were within the yield range of Kennebec. However, all clones were higher in specific gravity than this variety. Also, though most clones produced significantly less tuber yields than Kennebec, only four clones produced slightly less starch per acre on a calculated basis than Kennebec.

Table 5. Yields of advanced-early and medium-early clones and varieties harvested 100 days after planting.

Pedigree	CWT/A 2" and above	Percent of total yield	Percent of yield 2" and above		Tuber ¹ / rating	Specific ² / gravity	Color		Tex
			2 to 2 $\frac{1}{4}$ "	2 $\frac{1}{4}$ to 3 $\frac{1}{4}$ "			Chip	50°3/ FF	
B6516-5	338	92	35	58	4	87	5.6	1.4	2.0
B6532-4	399	94	28	58	4	86	8.0	3.8	1.5
B6535-10	384	90	39	59	2	69	7.5	3.0	2.4
B6558-16	392	94	19	68	4+	82	7.9	3.3	2.0
B6595-12	230	88	40	58	3	99	5.5	1.7	1.0
B6599-1	352	95	29	62	3+	77	7.3	3.3	1.8
B6692-5	395	95	20	69	4-	77	9.5	4.2	2.0
B6708-1	272	74	57	41	3-	82	8.8	3.3	1.8
B6731-2	359	90	31	56	2	65	6.4	2.2	2.0
B6928-8	411	98	44	72	4+	73	8.3	3.9	2.0
B6928-10	313	90	7	52	4	77	9.1	4.0	2.4
B6929-10	357	88	42	56	3	77	7.8	3.5	2.0
B6951-1	324	84	57	43	4	79	7.4	2.4	2.0
B6952-3	338	92	29	61	3+	85	8.2	3.8	2.0
B6968-3	329	81	60	40	3	70	7.3	3.0	2.0
B6969-1	432	94	18	64	4	70	7.5	3.0	2.0
Cobbler	409	93	31	65	3-	79	6.8	2.6	2.0
Cherokee	340	89	32	56	2+	75	5.5	1.5	2.0
Monona	319	91	31	61	3-	73	6.6	2.3	2.0
LSD 5%	35					07	1.2	0.6	

¹/ 1 = very poor to 5 = outstanding

²/ 1.0 omitted

³/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 6. Yields of advanced medium-maturing clones harvested 110 days after planting.

Pedigree	CWT/A 2" min.	Percent of total yields	Percent of yield 2" and above			Tuber ^{1/} rating	Specific ^{2/} gravity	Color Chip	50°3/ FF	Tex
			2 to 2 1/4"	2 1/4" to 3 1/4"	3 1/4" to 4"					
B6376-6	432	99	12	53	35	3+	81	7.9	3.8	1.7
B6516-15	397	95	17	67	18	3-	89	7.0	2.1	1.6
B6516-26	382	96	17	72	11	3	98	5.8	1.8	1.2
B6518-10	430	90	23	53	25	3-	80	9.1	4.1	2.0
B6532-2	262	93	41	57	2	3	99	7.7	3.0	1.7
B6562-14	403	96	19	65	17	2+	87	7.0	2.6	1.5
B6705-10	434	96	5	56	38	3	79	7.5	2.9	2.0
B6712-17	376	95	18	64	19	3	87	6.8	2.7	1.8
B6739-2	369	91	19	60	22	2+	89	7.6	4.1	2.0
B6741-3	403	96	14	65	20	2	72	7.5	3.4	2.1
B6761-1	438	88	13	63	24	3	64	8.3	3.8	2.5
B6799-5	495	95	14	71	14	2	63	8.0	3.4	2.5
B6928-18	438	88	33	59	8	3	77	8.9	3.3	2.0
B6930-6	418	93	36	64	0	4	80	8.9	3.7	2.0
B6936-9	310	97	16	73	11	3+	91	7.3	2.4	2.0
B6951-5	330	87	14	59	26	4	73	7.0	2.6	2.0
B6955-17	332	90	47	53	0	4	87	6.8	2.3	1.0
B6955-24	345	96	20	72	9	3+	94	6.5	2.3	1.2
B6967-8	455	95	22	67	11	4 (Red)	77	7.5	2.5	1.9
B6967-10	434	92	29	64	6	4 (Red)	71	7.7	3.2	2.0
B6969-2	407	96	21	58	23	4	71	7.3	2.8	2.0
B6969-9	455	94	22	64	9	3	81	8.2	3.0	2.0
B6987-54	355	95	24	61	15	3	88	7.3	2.3	1.8
B6987-56	449	95	26	57	17	4	97	7.2	2.1	1.5
Superior	393	93	20	62	17	2+	81	7.5	3.2	2.0
Alamo	431	95	32	58	10	3	69	8.5	4.0	2.0
Cherokee	369	93	28	58	15	2	84	7.2	2.5	2.0
Norchip	350	87	44	48	8	3	85	6.9	2.9	1.5
Seminole	330	95	16	67	17	2+	87	6.8	2.6	1.5
LSD 5%	48						06	1.1	0.6	

^{1/} 1 = very poor to 5 = outstanding

^{2/} 1.0 omitted

^{3/} Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 7. Yields of selected advanced late-maturing clones harvested 120 days after planting.

Pedigree	CWT/A 2" min.	Percent of total yield	Percent of yield 2" and above			Tuber rating	Specific gravity	Color Chip	50°3/	
			2 to 2 1/4"	2 1/4" to 3 1/4"	3 1/4" to 4"				FF	Tex
B6814-16	425	90	29	56	15	2+	82	8.0	3.1	2.4
B6815-14	485	94	11	63	24	3-	70	8.5	4.0	2.2
B6815-19	448	95	10	65	25	2 (Red)	73	7.9	2.6	2.0
B6930-1	440	90	36	56	8	3+	74	9.3	4.1	2.0
B6930-7	486	94	24	62	14	3	73	8.7	3.6	2.0
B6930-16	340	91	20	50	31	2+	67	8.5	3.8	2.0
B6932-5	456	92	15	64	22	2	82	8.7	8.0	2.0
B6934-9	455	91	30	63	8	3+	75	8.3	3.5	1.8
B6934-12	403	89	27	58	15	3	75	8.5	2.9	2.0
B6952-3	387	93	39	54	8	4-	98	7.6	3.0	2.0
B6955-14	445	97	22	73	5	3-	88	7.2	2.6	1.5
B6955-25	386	95	29	63	9	2+	73	7.7	2.5	1.6
B6955-33	350	91	41	60	0	4	94	6.6	1.6	1.9
B6955-35	345	91	35	60	5	3+	88	6.8	1.7	1.6
B6966-1	415	92	25	63	12	3	84	8.0	3.2	2.0
B6967-9	365	94	29	56	15	3 (Red)	81	8.3	3.1	1.6
B6974-14	525	93	13	65	22	3-	67	7.8	3.5	2.1
B6974-28	482	95	22	64	14	3+	72	9.0	4.1	2.0
B6986-2	390	92	12	55	34	4-	82	6.5	1.4	1.6
B6987-1	474	94	20	62	18	3-	75	8.2	2.6	1.9
B6987-2	489	94	12	62	27	3	86	7.9	2.2	1.6
B6987-18	459	95	10	58	33	2	78	6.8	2.0	2.0
B6987-25	421	94	25	68	9	2+	86	7.1	2.0	1.4
B6987-29	437	93	17	68	15	2	83	7.3	1.7	1.3
B6987-37	494	97	15	69	16	2+	92	7.8	2.3	1.9
B6987-43	395	92	9	56	35	2	84	6.0	1.7	1.7
B6987-48	415	92	26	63	11	2+	88	8.2	2.5	1.5
B6987-57	378	98	10	62	28	3+	93	6.6	2.2	1.7
B6995-19	445	97	23	66	11	4	73	8.0	3.2	2.0
B7001-14	422	96	11	56	33	3+	70	7.9	2.2	2.2
B7001-18	381	90	36	55	11	4	76	8.5	2.9	1.7
B7007-30	555	96	19	67	15	3-	67	7.5	3.2	2.7
B7009-4	531	94	8	60	33	3-	74	8.2	3.5	2.0
B7010-5	428	94	21	60	19	2	70	7.9	3.0	2.0
B7013-4	411	90	37	54	9	2	73	9.7	3.5	1.9

Table 7 (continued).

Pedigree	CWT/A 2" min.	Percent of total yield	Percent of yield 2" and above			Tuber 1/ rating	Specific 2/ gravity	Color Chip	50°3/ FF Tex	
			2 to 2 1/4"	2 1/4" to 3 1/4"	3 1/4" to 4"					
B7024-4	421	94	17	63	20	2	79	8.1	3.5	1.8
B7024-6	385	92	29	60	11	2	88	7.7	2.1	1.7
B7024-7	413	96	16	65	19	2 +	82	6.7	2.0	1.2
B7024-10	422	94	25	68	7	2 +	74	9.2	3.7	2.0
B7024-17	468	93	11	60	29	4 -	92	7.7	3.2	2.0
B7033-14	467	97	22	61	13	2	92	8.5	3.0	1.8
B7033-24	457	96	15	62	19	2	80	8.3	3.4	2.0
B7033-26	430	93	29	53	18	2	87	8.0	2.7	1.5
B7033-33	301	85	21	47	33	2	82	7.9	3.0	2.0
B5141-6	391	94	27	57	16	3 -	101	6.7	2.0	1.6
Katahdin	474	94	17	67	17	3	79	8.3	3.1	1.8
Abnaki	490	96	24	58	18	3 +	80	8.2	3.0	1.9
Kennebec	505	93	12	73	15	2 +	81	7.5	2.5	2.0
Russet										
Burbank	384	84	69	30	1	2 -	86	8.5	3.5	2.0
LSD 5%	56						06	1.1	0.9	

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 8. Yields of some russet clones, 1973 harvested 120 days after planting (14" spacing, planted May 21).

Pedigree	Yield CWT/A 2" min.	Percent total yield	Percent yield 2" to 2 1/4"	Percent yield 2 1/4" to 3 1/4"	min. and above 3 1/4" to 4"	Tuber 1/ rating	Specific 2/ gravity	Color 3/ Chip	50° FF	Tex	Other Characteristics
B7147-6	310	95	9	58	32	3	87	8.8	4.2	2.0	Res. E.B., scab, vert., l.b.
B7147-8	272	92	42	57	1	4	85	8.0	3.6	1.9	Res. rootknot, virus A, vert., rhiz.
B7147-9	254	91	53	47	0	4	76	7.7	3.0	1.5	Res. rootknot, vert., scab, l.b.
B7147-10	399	91	50	47	3	3	87	9.5	4.0	2.0	Res. virus Y, vert., l.b.
B7147-15	202	97	16	67	17	2+	97	8.5	3.1	1.8	Res. virus A, rootknot, vert., rhiz.
B7147-40	257	92	49	51	0	3	82	7.6	3.0	1.8	Res. vert., scab
B7147-64	217	95	28	70	2	3	82	8.3	2.7	2.3	Res. rootknot, rhiz.
B7188-56	349	91	48	52	0	3	74	8.0	2.7	2.2	Res. vert., scab, l.b.
B7196-1	376	93	26	59	15	3	75	9.6	3.5	2.2	Res. virus Y
B7196-4	272	89	43	53	4	3	70	7.8	2.8	2.0	Res. pink eye
B7196-20	342	95	18	64	18	2	82	8.1	2.5	2.0	Res. rootknot, pink eye
B7196-23	367	95	17	76	7	3+	76	9.5	4.0	2.0	Res. rootknot, virus Y, l.b.
B7196-25	345	95	27	69	4	3	77	8.7	3.9	2.2	pink eye
B7196-37	355	87	55	44	1	2+	76	8.5	3.4	2.0	Res. virus Y, vert., scab
B7196-45	347	92	44	56	0	4+	73	8.0	3.4	1.9	Res. rootknot, scab
B7196-64	288	90	50	49	1	2	81	8.5	3.2	2.2	Res. virus A, vert., scab, l.b.
Norgold											Res. vert., scab, l.b.
Russet	354	92	28	63	9	3	76	9.5	4.9	2.0	Ex. type, widely adapt.
Russet											
Burbank	355	88	57	42	2	2-	89	8.6	3.2	2.0	Res. scab
LSD 5%	34						10	1.0	1.0		
1%	46						13				

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 9. Yields, chip and french fry quality of selected clones.

Pedigree	Yields CWT/A 2" min.	Percent of total yield	Percent of yield 2" and above 2 to 2 1/4" 2 1/4 to 3 1/4" 3 1/4 to 4"	Tuber 1/ rating	Specific 2/ gravity	Color Chip	50°3/ FF	Tex	Color Chip	40° F FF	Tex	Color Chip	40-70° F FF	Tex		
B6943-43	433	95	29	62	10	3+	86	7.7	2.7	1.7	8.7	3.5	1.9	8.1	3.1	1.8
B6943-46	408	98	9	57	34	3	81	8.0	3.1	2.0	9.5	3.9	2.0	7.9	3.1	1.8
B6955-4	444	96	21	70	9	4	89	7.0	2.5	1.8	7.7	3.1	1.9	6.8	2.7	1.7
B6987-90	437	94	14	67	19	3	93	7.0	1.6	1.8	7.1	2.5	2.0	7.1	2.1	1.7
B6987-136	427	92	9	71	20	3+	97	7.0	1.7	1.7	8.5	3.5	1.8	6.7	2.3	1.7
B6987-142	355	90	47	49	3	4	84	6.5	1.7	1.9	7.4	3.4	1.9	6.6	2.4	1.7
B6987-162	416	94	10	68	22	3	85	6.1	2.0	1.8	6.6	2.1	1.7	6.1	2.2	1.9
B6987-184	374	95	16	68	16	3-	96	6.9	2.1	1.8	8.2	3.2	1.6	6.0	1.5	1.6
B6998-41	384	91	35	60	5	4	91	6.8	2.4	1.9	7.7	2.8	2.0	7.2	2.7	2.0
B7024-35	384	96	14	69	16	4	84	7.5	2.5	1.9	7.9	3.5	1.8	7.1	3.4	2.0
B7024-64	407	92	9	56	35	4	86	7.0	2.5	2.0	8.8	3.4	2.1	7.7	3.1	2.0
B7033-49	401	91	34	57	9	3	87	7.6	2.2	1.8	8.0	3.6	2.0	7.3	3.1	2.0
K112-9	373	88	14	64	22	3+	105	8.6	3.7	1.4	10.0	4.5	2.0	8.0	3.2	1.5
K219-5	396	93	38	52	10	3-	99	5.7	2.0	1.4	6.3	1.8	1.3	5.9	1.9	1.3
S47156	453	92	17	66	19	3-	90	8.4	3.7	1.8	9.3	4.6	1.9	7.9	3.4	1.4
B5665-7	361	94	16	73	10	3-	86	6.9	2.1	1.8	7.8	3.2	2.2	6.4	2.3	2.0
B6603-12	438	96	41	60	0	3+	90	7.4	2.1	1.5	7.8	3.4	1.9	7.5	2.4	1.8
B5141-6	409	95	23	69	8	3	102	6.8	1.7	1.4	6.7	2.1	1.6	6.3	2.0	1.3
Kennebec	456	94	13	63	24	3+	81	7.4	2.5	1.9	7.6	3.4	2.0	7.5	2.6	2.0
Norchip	364	84	54	40	6	3+	84	7.5	2.9	2.0	8.2	3.1	1.9	7.6	3.7	1.9
Superior	418	97	21	61	19	3	78	8.1	3.3	2.0	9.0	4.2	2.0	7.9	3.3	2.1
LSD 5%	73						05	0.76	0.64		0.79	0.70		0.72	0.50	

-12-

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 10. Yields and other characteristics of selected clones resistant to race A of the golden nematode.

Pedigree	CWT/A 2" min.	Percent of total yield	Percent of yield			Tuber ¹ / rating	Specific ² / gravity	Color Chip	50°3/ FF Tex	
			2 to 2 $\frac{1}{4}$ "	2 $\frac{1}{4}$ to 3 $\frac{1}{4}$ "	3 $\frac{1}{4}$ to 4"					
B7149-6	480	92	36	55	9	2+	70	7.8	3.2	2.0
B7151-4	479	97	17	63	13	3	104	6.7	2.0	1.4
B7151-6	457	95	20	65	15	3	87	7.7	2.3	2.0
B7151-7	444	92	28	64	9	3+	94	6.7	1.8	1.8
B7151-9	488	93	17	70	13	2	90	5.5	1.7	1.3
B7152-3	375	88	46	52	2	4	75	7.5	2.1	1.8
B7152-8	438	94	24	66	11	2	83	8.4	3.5	2.0
B7152-11	403	84	50	46	4	3+	84	7.9	2.8	1.7
B7152-12	410	92	33	65	3	3+	76	8.1	3.5	2.0
B7152-14	491	95	23	63	14	4	77	8.5	3.7	2.0
B7153-14	457	94	21	71	7	4	75	8.3	3.5	1.9
B7153-30	402	85	46	49	5	2+	80	6.8	2.3	1.6
B7154-6	386	86	31	61	8	3	68	9.5	4.3	2.3
B7154-10	425	93	33	59	8	3-	75	6.5	2.0	1.8
B7155-3	437	88	32	58	10	2+	77	8.9	3.7	2.0
B7155-51	445	84	46	52	2	3	69	8.0	3.4	2.4
B7155-56	361	75	58	38	6	3	77	9.8	3.8	2.0
B7169-8	461	89	46	46	9	3	68	9.5	4.6	2.2
B7200-2	433	94	16	60	18	3-	67	7.5	2.8	1.8
B7200-3	456	93	14	55	31	3	66	10.0	5.0	2.0
B7200-6	463	86	39	58	4	3-	76	9.8	4.5	2.4
B7200-8	512	93	27	57	16	3	70	10.0	4.5	2.0
B7200-10	476	91	43	57	0	4	79	9.0	3.6	2.0
B7200-19	444	91	41	55	4	3	67	9.5	4.5	2.6
B7200-27	486	94	19	67	13	3	72	7.0	2.8	1.8
B7200-30	447	84	36	58	7	3+	71	10.0	4.3	2.0
B7200-32	461	88	29	68	3	3+	79	10.0	4.5	1.8
B7200-34	467	92	18	56	25	2+	68	9.3	4.7	2.0
B7200-35	483	95	15	70	15	2	71	9.3	4.0	2.0
Katahdin	420	89	23	57	19	3	81	9.0	3.8	2.0

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 11. Yields of clones with potential adaptation to starch production.

Pedigree	Total CWT/A	Specific ^{1/} gravity	Percent ^{2/} starch	Calculated starch production lbs/A
B6936-119	419	109	20.0	8380
B6987-16	488	91	16.8	8198
B6987-36	455	94	17.3	7871
B6987-187	442	96	17.8	7867
B6987-201	524	100	18.5	9694
B6987-224	528	101	18.5	9768
B6990-163	456	93	17.2	7843
B6998-15	420	105	19.4	8148
B7024-60	433	99	18.3	7924
B7024-81	528	97	17.9	9451
B7572-3	495	106	19.6	9702
B7583-7	459	97	17.9	8216
B7589-6	457	93	17.2	7860
B7589-8	486	95	17.6	8553
B7664-6	551	86	16.0	8816
B5141-6	434	103	19.0	8246
Kennebec	551	79	14.8	8154
LSD 5%	58	07		

^{1/} 1.0 omitted

^{2/} Houghland, G. V. C. 1966. Am. Potato Jour. 43:138.
(Specific Gravity, Dry Matter, and Starch Conversion Table in Potatoes available from Vegetable Laboratory, ARC-West, Beltsville, Maryland 20705).

USDA, Presque Isle, Maine

James Frank, David Wilson, and R. E. Webb

Disease Resistance Evaluations

The USDA potato disease testing program is an important step in the development of new breeding materials. This testing is carried out on Aroostook Farm in Presque Isle, Maine. The tests are conducted in isolated plots to prevent interference from other disease tests. The purpose of these tests is to remove the very susceptible seedlings from the breeding stocks and to rate all other seedlings as to their degree of resistance or tolerance. These reactions are merely indications of how the seedlings respond to disease situations under Maine environmental conditions. The resultant reactions will vary somewhat from year to year in the same location and also in different locations in the same year.

Weather conditions were excellent for late and early blight development, average for scab development, and below average for Verticillium wilt. The moisture levels were above normal in the months of June and July, and the month of June was generally warmer than average. These conditions are not optimal for scab development, but due to high inoculum levels in the soil, the test was successful. In July and August the temperatures were below normal and coupled with above average rainfalls, there were many mornings with heavy dews. This led to a very severe late blight epiphytotic and also aided in the spread of early blight. The moisture levels kept the development of Verticillium wilt below normal. Procedures for each disease test and the results are presented in the following discussion and tables.

Resistance to Verticillium Wilt (Verticillium albo-atrum). Inoculum for this test was grown in potato dextrose broth in shake culture. The bud cells from each flask were pooled and adjusted to 80,000 cells per ml. Two isolates of the pathogen were used to insure pathogenicity. The tubers of the test clones were cut, dipped with the inoculum, and planted immediately. The inoculated seedpieces were covered with soil, and a full hill was made immediately after planting. The test consisted of two four-hill plots per pedigree.

Wilt readings were made on five separate days starting in late July. The final readings for the two replications were averaged and reported in the tables following. Readings were made on a 1-5 scale with one indicating no disease and five signifying plant death. The average rating for susceptible checks Cherokee and Kennebec were 4.6 and 3.8, respectively. The average for resistant variety Abnaki was 2.8.

After tubers were harvested, readings were taken to determine the percentage of tubers in each test showing pink eye, a bacterial disease which appears after harvest or storage. This organism has generally been associated with Verticillium, although this association has been suspect. The tubers harvested in the Verticillium plot were all washed and examined. In the following tables, the reading in the pink eye column is reported as the percentage of total tubers infected in a pedigree. The susceptible variety Kennebec averaged 34 percent.

Resistance to Late Blight (Phytophthora infestans). Test clones were planted along with the variety Green Mountain, which served as a susceptible spreader. The

Green Mountains were planted as guard rows and every third row in the plot. The plot consisted of two replications of a two-hill plot. The plot was inoculated with a race 0 (common race) zoospore suspension in the last week of July and twice a week thereafter until the Green Mountains showed a heavy infection. Readings were taken once a week until plants were ready for harvest. Readings were made on a 1-5 scale with one indicating no disease and five signifying complete susceptibility.

Resistance to Early Blight (*Alternaria solani*). This field test consisted of two-hill plots, replicated twice with the guard rows, and every third row throughout the plot planted with a susceptible spreader (B5281-1). The plot was not inoculated because a heavy natural infection spread over the plot in the second week of July. Readings were taken once a week until plants were ready to harvest. Readings were made on a 1-5 scale with one indicating no disease and five signifying susceptibility.

Resistance to Common Scab (*Streptomyces scabies*). Tubers of the test clones were planted in the same field used in previous years for this test. The test consisted of two replications of a two-hill plot with susceptible Green Mountain planted as guard rows and every third row in the plot. The tubers were dug after Labor Day, and each tuber was rated and placed into a class. The two figures in the tables represent the number of tubers observed and the disease rating. The figure for disease rate is surface area affected/lesion type. For area: 0=none; 1=1-19%; 2=20-39%; 3=40-59%; 4=60-79%; and 5=80-100%. For type: 0=none; 1=small, superficial lesions; 2=medium-large but superficial; 3=large, slightly raised, or sunken; 4=large and rough; 5=coalesced and pitted. Green Mountain, the susceptible check averaged 1.6/2.7.

Presque Isle Table 1. Pedigrees tested in all disease trials, 1972.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B6603-12	2.7	89	5.0	4.0	28	.3/.9
B6928-8	3.2	0	5.0	5.0	13	.6/2.4
B6928-10	4.6	0	5.0	5.0	18	.5/1.3
B6928-18	4.2	0	5.0	5.0	33	.4/1.1
B6929-10	4.3	14	5.0	5.0	18	.8/2.0
B6930-6	3.8	13	1.5	4.7	26	.5/1.8
B6930-7	4.0	9	5.0	4.5	13	.5/1.6
B6930-16	5.0	29	5.0	4.7	14	.2/.7
B6931-1	5.0	21	5.0	4.5	17	.5/1.7
B6932-5	5.0	3	5.0	4.2	14	1.1/2.7
B6934-4	4.8	21	1.5	4.5	21	.3/.9
B6936-16	4.5	0	5.0	5.0	17	.8/2.4
B6936-26	4.2	0	5.0	5.0	15	.5/1.8
B6951-1	3	0	5.0	5.0	26	.7/1.4
B6951-5	4	17	5.0	5.0	18	2.2/3.8
B6955-8	3.7	6	5.0	5.0	20	.9/1.9
B6955-14	3.7	6	5.0	5.0	21	1.3/2.5
B6955-17	4.5	4	5.0	5.0	22	.8/1.6
B6955-24	4.3	11	5.0	5.0	17	.6/2.0
B6955-25	4.1	11	5.0	5.0	20	2.9/3.6
B6955-33	4.0	6	5.0	5.0	25	.9/2.2
B6955-35	3.3	0	5.0	5.0	25	2.0/3.5
B6966-1	3.3	22	5.0	4.5	26	.9/2.7
B6967-9	3.0	0	5.0	5.0	21	.6/2.4
B6967-10	4.7	0	5.0	5.0	19	.2/.9
B6968-3	5.0	0	5.0	5.0	21	.3/1.0
B6969-1	4.5	11	5.0	5.0	32	.4/.9
B6969-2	3.5	0	5.0	5.0	24	1.4/2.5
B6969-9	2.8	24	1.5	5.0	15	1.1/1.8
B6995-19	4.0	71	5.0	5.0	18	1.0/2.6
B7013-4	4.1	11	5.0	5.0	19	1.5/2.3
B7024-4	4.7	6	5.0	5.0	20	1.1/1.9
B7024-6	4.1	4	5.0	5.0	20	1.7/3.1
B7024-7	4.1	0	5.0	5.0	24	2.0/3.0
B7024-10	4.6	10	5.0	5.0	17	1.3/2.9
B7024-17	3.7	9	5.0	5.0	15	1.2/2.6
B7033-14	4.8	26	5.0	5.0	16	1.9/3.7
B7033-24	4.5	0	5.0	5.0	25	2.3/3.0
B7033-26	4.3	36	5.0	5.0	29	2.3/2.2
B7130-7	4.1	7	5.0	5.0	17	.8/1.3
B7130-22	4.6	16	5.0	5.0	23	1.0/2.6
B7132-1	4.0	0	5.0	4.5	15	1.5/2.2
B7132-14	4.2	22	5.0	5.0	19	.9/1.9
B7132-19	5.0	0	5.0	4.2	18	.6/1.7
B7132-21	4.5	0	5.0	5.0	16	.9/1.6
B7132-22	4.6	12	5.0	5.0	19	1.0/1.5
B7132-25	4.3	0	5.0	5.0	23	1.0/2.0
B7132-26	4.7	0	5.0	5.0	21	1.6/1.8

Table 1. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B7132-27	4.2	0	5.0	5.0	17	.5/1.1
B7132-29	4.5	3	5.0	5.0	20	1.0/2.1
B7134-3	4.2	20	5.0	4.7	22	1.3/2.6
B7136-5	4.7	2	5.0	5.0	22	2.1/2.1
B7137-18	4.3	0	5.0	5.0	23	1.3/2.4
B7138-2	4.8	24	5.0	5.0	25	2.0/3.2
B7138-8	4.6	38	5.0	5.0	26	1.6/2.5
B7139-4	3.0	0	5.0	4.0	8	1.3/2.1
B7139-6	3.1	14	5.0	4.7	12	1.6/3.1
B7139-12	4.6	43	5.0	4.7	19	.7/1.8
B7139-15	4.6	4	5.0	5.0	13	.5/1.2
B7141-1	4.2	22	5.0	5.0	20	1.4/2.0
B7145-3	4.1	0	5.0	5.0	18	1.2/2.8
B7147-5	4.1	0	5.0	5.0	20	.3/.9
B7147-6	4.0	0	5.0	4.7	13	----
B7147-7	2.0	0	5.0	4.2	11	.9/1.3
B7147-9	3.0	3	5.0	5.0	10	.3/.6
B7147-89	3.5	5	5.0	4.7	16	----
B7147-93	4.2	3	5.0	5.0	16	.2/1.0
B7147-94	3.6	3	5.0	5.0	24	----
B7147-100	4.5	14	5.0	5.0	22	1.9/2.9
B7147-102	4.6	0	5.0	5.0	11	.3/1.0
B7148-1	4.6	0	5.0	5.0	21	.3/1.0
B7148-4	4.7	0	2.0	5.0	22	1.0/2.4
B7148-9	4.8	0	1.5	5.0	29	2.1/3.1
B7149-4	3.8	0	5.0	4.2	25	1.8/3.6
B7149-6	4.8	2	1.7	5.0	15	.8/2.8
B7151-1	2.2	1	5.0	4.7	18	.6/1.5
B7151-6	3.6	15	5.0	5.0	21	1.8/2.7
B7151-7	4.7	11	5.0	5.0	27	.3/.7
B7151-9	4.1	3	5.0	4.7	18	.3/1.2
B7152-1	5.0	50	5.0	5.0	17	.3/.4
B7152-3	5.0	0	5.0	5.0	23	.2/.8
B7152-5	3.0	0	5.0	3.7	14	.3/2.2
B7152-8	4.5	25	5.0	5.0	22	.7/2.2
B7152-11	4.5	0	5.0	5.0	17	.7/2.5
B7152-12	4.5	0	5.0	5.0	30	.8/2.4
B7152-14	4.1	17	5.0	5.0	22	.3/.9
B7152-31	4.1	11	5.0	5.0	15	.2/.8
B7153-1	4.6	40	5.0	5.0	24	1.4/3.8
B7153-14	4.7	8	1.5	5.0	35	.9/2.9
B7153-21	4.6	18	1.5	5.0	23	1.1/3.1
B7153-29	4.2	11	1.5	5.0	26	.9/2.1
B7154-6	4.7	8	5.0	5.0	26	.9/2.4
B7154-8	4.6	0	5.0	5.0	26	.8/1.7
B7154-10	4.6	0	5.0	5.0	18	1.0/2.2
B7155-3	3.8	6	5.0	5.0	19	.6/2.4
B7155-14	2.1	7	5.0	4.2	27	.5/1.4
B7155-51	4.3	29	5.0	5.0	19	.3/1.5

Table 1. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B7155-56	4.8	50	5.0	5.0	20	.7/1.8
B7158-34	4.1	3	5.0	5.0	15	1.5/3.4
B7158-35	5.0	0	5.0	5.0	18	.6/1.4
B7158-48	3.5	25	5.0	5.0	10	1.0/2.6
B7159-23	4.5	4	5.0	5.0	14	----
B7159-32	4.0	0	5.0	5.0	19	----
B7159-37	3.6	78	5.0	5.0	19	1.2/1.5
B7160-1	4.7	0	5.0	5.0	20	----
B7160-4	3.5	0	1.5	5.0	16	----
B7161-3	4.5	14	5.0	4.5	27	.8/1.7
B7161-11	4.2	11	1.5	5.0	25	.9/1.9
B7164-22	3	8	5.0	4.5	14	1.0/2.2
B7164-25	4.0	2	5.0	5.0	17	1.0/1.2
B7165-2	3.7	5	1.7	5.0	31	1.6/2.8
B7165-6	4.2	0	1.5	4.7	20	1.0/2.2
B7165-8	4.1	31	1.2	4.7	21	1.6/2.9
B7165-10	4.7	0	5.0	5.0	21	.7/2.3
B7165-15	1.6	0	5.0	4.5	18	2.1/3.2
B7165-17	4.5	5	5.0	5.0	27	.8/2.4
B7165-18	5.0	17	5.0	5.0	20	.5/2.3
B7167-2	4.1	23	5.0	5.0	9	----
B7167-9	3.2	0	5.0	5.0	10	1.2/3.7
B7167-14	4.0	0	5.0	5.0	8	1.5/2.7
B7167-26	3.2	7	5.0	5.0	17	1.6/2.1
B7167-30	4.0	0	5.0	5.0	13	1.0/2.3
B7168-2	3.3	47	5.0	5.0	18	.2/.8
B7169-7	3.3	0	5.0	5.0	21	----
B7169-8	3.6	0	5.0	5.0	21	1.0/2.0
B7178-3	3.6	0	1.5	5.0	20	.6/2.2
B7181-21	3.5	0	5.0	5.0	18	.5/1.6
B7183-1	3.0	0	1.5	4.5	17	.1/.3
B7188-37	4.1	0	5.0	5.0	12	.2/1.7
B7188-42	3.8	0	5.0	5.0	17	----
B7188-45	3.7	0	5.0	5.0	22	.1/.2
B7188-48	4.6	0	5.0	5.0	21	----
B7188-56	3.7	0	5.0	5.0	24	----
B7189-1	4.0	0	5.0	5.0	19	----
B7189-4	4.3	0	5.0	5.0	28	----
B7189-9	4.5	25	5.0	5.0	21	.4/1.0
B7190-2	4.0	9	5.0	5.0	12	1.3/3.3
B7190-4	3.9	5	5.0	4.7	21	1./2.5
B7196-13	3.2	0	5.0	5.0	16	----
B7196-25	4.8	0	5.0	5.0	16	----
B7196-38	4.0	43	5.0	5.0	29	1.4/3.2
B7196-48	4.2	0	5.0	5.0	11	.1/.7
B7196-61	3.8	0	5.0	5.0	21	.1/.7
B7196-64	4.8	0	5.0	5.0	22	.9/3.0
B7196-65	4.7	0	5.0	5.0	20	----
B7196-82	3.5	0	5.0	4.2	12	----
B7196-90	3.6	0	5.0	5.0	16	----

Table 1. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B7196-104	4.1	0	5.0	5.0	25	----
B7198-5	3.7	0	5.0	5.0	23	.6/2.3
B7198-6	3.2	0	1.5	3.7	17	.8/3.0
B7200-2	4.3	0	5.0	5.0	22	.1/.3
B7200-3	2.5	0	1.5	4.0	20	.2/1.7
B7200-6	3.0	2	5.0	4.7	26	.1/.6
B7200-8	4.0	0	1.5	5.0	22	.2/.9
B7200-10	3.5	0	5.0	4.0	24	.3/.9
B7200-19	4.7	0	1.7	5.0	22	.5/1.4
B7200-26	3.6	0	5.0	5.0	15	.5/1.7
B7200-30	3.6	0	5.0	5.0	20	.4/1.3
B7200-32	3.3	0	1.2	5.0	19	.5/1.8
B7200-34	3.1	5	1.2	5.0	19	.5/1.8
B7200-35	4.5	0	2.0	4.7	20	----
B7200-37	4.8	0	2.0	5.0	32	1.0/1.6
B7200-40	4.1	0	5.0	5.0	25	.9/2.5
B7221-7	3.8	0	5.0	4.7	25	1.2/2.3
B7221-8	4.2	0	5.0	5.0	22	1.8/4.0
B7221-16	4.6	8	5.0	4.7	25	1.4/3.0
B7233-12	4.7	28	5.0	5.0	18	1.2/3.2
B7252-3	4.5	6	1.5	4.5	28	.8/2.3
B7254-2	4.2	5	2.0	5.0	16	1.6/.6
B7262-7	4.4	7	1.7	5.0	28	1.0/2.1
BR7044-2	4.5	16	2.0	5.0	11	2.2/2.6
BR7047-11	4.0	0	5.0	5.0	21	1.4/1.9
BR7049-4	5	0	5.0	4.7	17	.3/.6
BR7051-3	3.5	7	1.2	5.0	27	2.1/2.0
BR7061-4	4.3	0	5.0	5.0	22	1.0/2.3
BR7076-3	4.8	0	1.5	4.7	30	1.2/2.3
BR7083-1	4.7	0	5.0	5.0	29	.8/2.4
BR7089-1	2.6	0	5.0	4.7	14	.8/2.0
BR7102-4	4.7	0	5.0	5.0	28	.9/1.2
BR7106-5	4.7	0	5.0	5.0	16	1.3/2.3
BR7110-3	3.3	0	1.5	4.0	36	1.5/2.9
BR7111-1	2.3	0	1.2	3.7	21	2.4/3.4
K112-9	3.1	30	5.0	4.5	19	1.0/2.3
K194-4	3.0	54	5.0	5.0	28	3.2/4.3
K195-9	4.1	54	5.0	5.0	27	3.3/4.4
K211-1	3.6	11	1.5	5.0	13	1.0/2.4
K214-2	3.6	2	5.0	5.0	30	.6/1.6
K219-5	3.0	0	5.0	5.0	26	.9/2.0

Presque Isle Table 2. Pedigrees not included in all disease trials, 1972.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B5288-5	4.1	74	2.5			
B5952-10			5.0			
B6327-3	4.6	0	3.0			
B6327-5	3.1	0	5.0			
B6328-8	3.2	52	5.0			
B6329-2	3.7	0	1.2			
B6330-3	2.2	0	5.0			
B6330-5	2.3	29	5.0			
B6355-5	2.7	0	5.0			
B6907-2				5.0		
B6929-1				5.0	13	.5/2.0
B6930-1			5.0	5.0		
B6934-7			5.0	5.0		
B6934-9			1.2	4.0		
B6934-12			1.7	4.0		
B6936-55	3.8	6	5.0		20	.6/1.2
B6936-65	5.0	40	5.0		16	.5/1.6
B6936-119	5.0	9	5.0		18	.2/.9
B6943-22			5.0			
B6943-43			5.0		20	1.1/2.6
B6943-46			5.0		24	1.4/3.2
B6943-47					22	.9/1.4
B6943-64			5.0			
B6944-28				4.5		
B6952-3				4.7		
B6952-10	4.2	3		5.0	16	1.2/2.8
B6952-14			5.0		17	1.0/3.8
B6952-21			5.0		21	.9/1.0
B6955-4			5.0		22	1.5/3.3
B6955-10	2.8	25			22	2.0/3.0
B6967-1				5.0		
B6967-2	5.0	0			23	.9/3.1
B6967-8	3.1	0	5.0			
B6974-14				4.5		
B6980-47			1.5		27	.8/2.2
B6985-16			5.0		21	.1/.6
B6985-36			5.0		27	1.0/2.1
B6985-59			5.0		28	1.8/3.5
B6985-67	4.5	76			21	1.3/2.8
B6986-2				5.0		
B6986-10			5			
B6987-1				5.0		
B6987-2				5.0		
B6987-18				5.0		
B6987-22				5.0		
B6987-25				5.0		
B6987-29				4.7		
B6987-33				4.5		

Table 2. Continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B6987-43				5.0		
B7987-48				4.5		
B6987-54				5.0		
B6987-56				5.0		
B6987-57				4.7		
B6987-86			5.0		16	.5/1.2
B6987-131			5.0		25	1.6/2.1
B6987-135	4.5	0				
B6987-136			5.0		15	.9/2.5
B6987-142			5.0		22	1.2/1.9
B6987-144		1	5.0			
B6987-145					13	.6/2.8
B6987-148	2.7	0				
B6987-158	2.3	3	5.0		19	1.4/1.7
B6987-162	27	26	5.0		8	.1/.3
B6987-168	2.6	26				
B6987-184	2.3	0	5.0		18	.9/2.2
B6987-187	2.7	0	5.0		20	.6/1.9
B6987-201	2.0	0	5.0		17	.5/2.0
B6987-221	3.7	0	5.0		28	1.2/2.1
B6987-224	3.0	11	5.0		23	.5/1.4
B6990-153	2.8	0	5.0		27	.5/1.9
B6990-163	3.1	4	1.2		18	1.2/1.9
B6998-15	3.7	0	5.0		21	1.3/2.8
B6998-19	1.7	38			15	1.6/3.5
B6998-41	2.5	0	1.5		23	.5/1.6
B7001-4				5.0		
B7001-18				5.0		
B7007-30			5.0	4.7		
B7008-4			5.0		25	1.1/2.8
B7008-14				5.0		
B7009-4				4.2		
B7010-5				4.7	19	1.2/1.3
B7024-24	3.6	4	5.0		20	1.4/2.7
B7024-33	3.7	29	5.0		17	.9/1.5
B7024-35	3.0	10	5.0		11	.6/1.5
B7024-55	3.3	0	5.0		27	.5/1.7
B7024-60	3.8	33	5.0		25	.4/1.6
B7024-63	3.6	4	5.0			
B7024-64	4.1	33	5.0		16	.9/1.6
B7024-81	4.1	0	5.0		24	.7/1.5
B7024-85	3.8	4.5	5.0		24	.7/2.6
B7024-88	4.1	7	5.0		20	.9/2.4
B7024-99	4.0	0	5.0		25	1.2/2.6
B7029-1				5.0		
B7033-33			5.0	5.0		
B7033-40	4.0	16	5.0		13	1.1/2.6
B7033-49	4.5	10	5.0		23	1.7/2.8

Table 2. Continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	#Tubers	Scab Rate
B7033-75	4.0	5	5.0		24	1.5/2.7
B7068-4	4.3	0		5.0		
B7138-11	2.6	41	5.0	5.0	20	2.1/3.3
B7139-8	4.0	0			12	1.2/2.5
B7143-6	4.6	0	5.0		15	---
B7143-12	3.1	0	5.0	4.0	--	---
B7143-18	4.1	0	5.0			
B7146-1	4.1	0	5.0		18	---
B7147-20				5.0		
B7147-76			5.0		11	---
B7147-90			5.0		17	.1/.
B7153-7						
B7153-30	4.6	18			21	.6/1.5
B7154-16	3.8	3	5.0		20	.9/2.0
B7155-34	4.2	0	5.0		19	1.4/2.1
B7155-61	4.1	10	5.0		22	1.1/2.7
B7158-1	3.8	6	5.0	5.0		
B7158-10					19	.5/2.3
B7164-12	4.0	24	5.0	5.0		
B7164-27					15	.3/1.6
B7173-7	3.6	10		5.0	19	.6/1.8
B7173-8	4.2	65		5.0	23	.9/1.1
B7178-3	3.6	0	1.5			
B7181-21	3.5	0	5.0			
B7196-45	4.4	0	5.0	5.0		
B7196-49					25	.6/1.0
B7196-74					4	---
B7196-86	3.6	0	5.0		17	.1/.
B7196-101			5.0	5.0	34	---
B7200-27	3.5	0		5.0	21	---
B7212-13	5.0	14	5.0	5.0		
B7213-3					20	.7/1.1
B7222-29	4.0	0	5.0		19	.8/2.5
BR7072-12				4.7		
BR7085-1	4.6	15	1.5	5.0		
BR7086-1					18	.9/1.6
BR7088-1				4.7		
BR7088-2				4.7		
BR7091-1				5.0		
BR7095-1						
BR7095-6			5.0	4.0	25	1.3/2.2
BR7103-2			5.0	5.0	19	1.3/2.9
BR7103-7			1.7	5.0	15	.5/1.6
BR7183-2	4.0	25				
BR7183-7	3.3	7				

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

P. R. Rowe and R. W. Ross

Introduction of New Stocks. Two hundred four new stocks were received from 7 countries. Nearly all are introductions of 13 endemic species provided by K. A. Okada from the germplasm collection maintained at Balcarce, Argentina. Also added, contingent upon germination, were more than 350 seed packets containing the remnants of some of J. G. Hawkes' original species collections and interspecific hybrids. Although many are duplicates, this sending may eventually provide as many as 100 species collections not introduced earlier.

Preservation and Increase of Stocks. Approximately 90% of the species introductions are being maintained as true seed. Satisfactory increases of 191 seed introductions were obtained under glass, plastic, or screen. Recently harvested seed samples of 136 introductions were sent to the National Seed Storage Laboratory. Five hundred seventy-four clonal selections were indexed for viruses, A, M, S, X and Y. A trial program to better utilize clonal introductions of varieties and advanced breeding stocks, restricted by U. S. Plant Quarantine to the production of true seed because of virus infection, was initiated. Thirteen of the 15 parental stocks submitted by U. S. potato breeders were crossed to one or more of the introduced stocks, and the F_1 seed obtained will be shared with each participant.

Classification. J. P. Hjerting spent two months in Sturgeon Bay plotting the site of collection for all stocks in the IR-1 Collection as well as recorded collections of herbarium specimens. This information will be used to plan future collecting expeditions.

Distribution of Stocks. Shipments were sent to 17 states and 26 countries. Shipments included 2045 seed and 1466 tuber samples of species introductions, and 89 seed and 1126 tuber samples of germplasm involving introductions developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project.

Over 350 copies of the new "Inventory of Interspecific and Intervarietal Hybrids of Tuber-Bearing Solanum Species" were distributed to potato researchers and libraries around the world. This inventory includes nearly 500 representative interspecific or intervarietal cross combinations, and lists the screening data compiled for the parents through December 1971. More than 25 additional copies of the 1969 "Inventory of Tuber-Bearing Solanum Species" were distributed. Mimeographed listings of 206 species introductions available in the form of tuber families (mainly for the benefit of potato workers without adequate greenhouse facilities) were distributed to 170 scientists.

Evaluation of Stocks. Evaluation results from cooperators were compiled for the newly released inventory and for further use in the revision of the 1969 inventory.

Foreign Visitors.

J. P. Hjerting, Botanical Garden, Copenhagen, Denmark.
D. R. Suchomel, Benue and Plateau State, Nigeria.
H. De Jong, Canada Department of Agriculture, Fredericton.
W. A. Russell, Canada Department of Agriculture, Morden.
G. M. Weaver, Canada Department of Agriculture, Fredericton.

Usefulness of Findings. The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germ-plasm and are conducting incessant researches to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

One hundred twenty-four of the 128 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigree. These varieties comprise approximately 65% of the annual seed potato production in the United States.

Basic research programs being conducted in several states and other countries, are developing information concerning the potential value and diversity of the Solanum species. In 1972, 32 papers, 8 abstracts and 3 theses were published that reported the use of Solanum introductions. These researches will provide the knowledge needed for more effective use of the Solanum species in the future.

NORTH DAKOTA

R. H. Johansen and Cooperators^{1/}

North Central Regional Trials--1972

The year 1972 was the twenty-second year that the North Central Regional Trials have been conducted. This past season, nine states participated in the trials with Nebraska and Indiana growing two trials. The Louisiana trial was lost due to flooding and poor weather conditions.

The benefits derived during the years the trials have been in existence is evident in the number of clones that have been tested in the trial and are now popular named varieties. Some twenty varieties grown for certified seed in the U.S. were once tested in the North Central Trial.

No new varieties were introduced during 1972.

Environmental Conditions. Soil type at each location ranged from clay loam to course sand. Sandy loam or silt loam was the most common soil type.

Cultural Practices. Fertilizer applications, irrigation, spray programs, vine killing, spacing, etc. are based on local conditions.

For insect control, Thiodan, Di-Syston, Phorate, Guthion, Sevin and Thimet were all used. For late blight control, Polyram, Maneb, Dithane M45 and Dithane M22 were the most popular fungicides used. Eptam, Patoran, Lorox and Sencor were used the most for weed control.

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Indiana (early)	May 11	October 18	161
Indiana (late)	March 24	July 20	119
Kansas	March 23	August 1	102
Michigan	May 16	September 20	127
Minnesota	May 25	September 15	114
Missouri	March 22	August 9	141
Nebraska (summer)	April 4	July 24	110
Nebraska (fall)	May 18	September 7	113
North Dakota	May 15	September 21	130
Ohio	May 22	October 27	159
Wisconsin	April	September	?

In comparison to 1971, the 1972 season was not as good a year for potato production. Temperatures and rainfall varied. Missouri, Michigan and North Dakota had it cool for part of the season, while Nebraska had quite high temperatures. Rainfall was about normal in most states. The only state reporting frost was Missouri where a few leaflets were damaged in June. Several states irrigated.

^{1/} Indiana, C. M. Jones; Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, N. Thompson; Minnesota, O. Turnquist and F. Lauer; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. Johansen; Ohio, A. R. Mosley; Wisconsin, J. Schenman, D. Kichefski and S. Peloquin; USDA, R. Webb.

Entries. Entries were received from North Dakota, Nebraska, Louisiana, Wisconsin, Minnesota and the USDA, Beltsville, Maryland. North Dakota supplied the check varieties, Norland, Red Pontiac, Norchip and I. Cobbler. The three Minnesota entries were not planted at South Bend, Indiana.

Nebraska planted a trial at Center City and Alliance, while Indiana planted a trial at South Bend and Vincennes.

Yield. Total and U.S. No. 1 yield are reported in North Central Tables 1 and 2. Wisconsin reported the highest yields, which ranged from 400-900 cwt/A. Michigan, Ohio and South Bend, Indiana also reported high yields.

Norchip was the highest yielding entry in the early group, and Red Pontiac was the highest yielding in both the early and late groups. Several selections like W710, B6097-9, B6495-20, W623 and La71-110 all produced quite high U.S. No. 1 yields. Line ND7103-4 was one of the lowest yielding entries.

Maturity. Norland was again the earliest maturing entry in trial. Selections B6495-12 and B6495-20 were the latest maturing. Some selections reported to be late maturing were actually early at several locations. Maturity is reported in North Central Table 3.

Total Solids. In both the early and late group, Norchip produced the highest total solids, while W710 was the lowest. Several entries produced total solids averaging over twenty percent (North Central Table 4).

Scab Reactions. Indiana, Missouri and Wisconsin reported no scab. Norland and La71-82 were the most scab resistant entries in trial (North Central Tables 5 and 6). Line Neb 139.59-1 seemed to be the most susceptible entry.

Internal and External Defects. A summary of defects are found in North Central Table 6. A particular weakness of a variety is starred only to call it to the developer's attention.

Overall Merit Ratings. Merit ratings are presented for the 1970, 1971 and 1972 seasons.

	<u>1970</u>	<u>1971</u>	<u>1972</u>
B6097-9	x	11	26
W623	x	x	24
W629	x	4	15
Minn 3866	x	x	14
ND7196-18	14	17	13

x = Not Entered

Chip Quality. North Central Table 8 shows the chip quality of entries grown in Kansas, Michigan, Nebraska, North Dakota and Wisconsin. It is hoped all states will run chip tests in 1973. Selections ND7196-18, Neb 1.57-1, La71-82, W623, W629 and ND7103-4 all produced good to fair chip quality. Only W623 and ND7103-4 produced chips as light or lighter than the standard chip variety Norchip.

North Central Table 1. Total yield (cwt/A).

Variety	Ind. 1/		Ind. early	Kansas	Mich.	Minn.	Mo.	Late 2/		N.D.	Ohio	Wisc.	Ave.
	late	early						summer	fall				
ND6925-13	292	225	252	257	295	150	197	209	156	364	455	259	
ND7196-18	264	311	283	373	266	206	203	201	192	263	655	292	
Norland	353	223	225	273	287	173	180	204	141	340	542	267	
I. Cobbler	328	267	336	336	317	236	294	246	228	392	453	312	
Norchip	449	239	319	312	318	188	233	314	190	340	655	323	
Med. to late													
Neb 1.57-1	418	177	212	341	282	204	143	209	162	401	468	274	
Neb 99.56-4	247	207	231	223	325	143	149	195	185	350	554	255	
Neb 139.59-1	334	219	260	284	341	110	102	160	165	350	475	255	
Ia 71-82	452	260	306	376	259	196	158	235	183	346	728	318	
Ia 71-110	430	229	358	367	314	180	188	283	178	497	704	339	
W623	426	214	320	417	271	201	177	268	237	442	650	329	
W629	381	181	274	289	256	135	138	208	152	341	550	264	
W710	340	268	328	371	364	181	239	286	262	503	766	355	
Minn 3866		244	332	392	390	156	269	243	240	310	563	314	
Minn 3915		228	244	279	354	58	209	231	160	323	460	255	
Minn 3935		267	320	215	423	161	204	263	220	428	562	306	
B6097-9	546	307	336	301	307	250	225	320	187	544	742	370	
B6495-12	422	275	300	512	342	201	91	332	189	446	700	346	
B6495-20	508	244	274	460	282	191	199	268	201	451	597	334	
ND7103-4	349	155	145	261	208	91	158	207	158	274	413	220	
Red Pontiac	568	301	369	595	328	280	152	366	286	556	968	434	
BR6491-1							176	127					
BR6863-3							153	129					
BR7093-23									162				
BR7072-5									247				
Average	395	240	287	344	311	176	184	239	194	393	603		

1/ Indiana Trials--(a) planted (late) May 11 at South Bend and harvested Oct. 18.; (b) planted (early) March 24 at Vincennes and harvested July 20.

2/ Nebraska Trials--(a) planted late summer, April 4 at Central City and harvested July 24.; (b) planted late fall, May 18 at Alliance and harvested Sept. 7.

North Central Table 2. U.S. No. 1 yield (cwt/A).

Variety	Late		Early Ind.	Kansas	Mich.	Minn.	Mo.	Late summer		Late fall		N.D.	Ohio	Wisc.	Ave.
	Ind.	Ind.						Neb.	Neb.	Neb.	Neb.				
ND6925-13				90	206	265	143	130	161	127	252	348	191		
ND7196-18				110	323	225	198	110	143	143	176	590	225		
Norland				122	244	278	169	135	182	128	289	490	226		
I. Cobbler				209	300	304	232	209	201	202	292	356	256		
Norchip				211	287	305	183	165	273	170	289	608	277		
Med. to late															
Neb 1.57-1				131	308	265	200	117	186	151	344	410	235		
Neb 99.56-4				118	211	314	133	87	160	164	292	485	218		
Neb 139.59-1				172	265	321	105	74	136	146	317	417	217		
La 71-82				247	365	241	184	103	174	162	239	683	266		
La 71-110				306	322	296	171	154	215	158	385	655	296		
W623				263	394	257	196	144	214	220	356	637	298		
W629				221	264	249	126	92	175	112	307	501	227		
W710				185	352	348	173	191	214	241	415	715	315		
Minn 3866				196	373	356	150	217	194	215	259	486	272		
Minn 3915				152	262	338	52	165	184	143	238	371	212		
Minn 3935				175	207	405	157	163	213	194	345	491	261		
B6097-9				189	292	288	243	146	234	172	412	692	293		
B6495-12				145	502	323	188	60	272	154	362	628	293		
B6495-20				220	444	249	185	157	223	186	357	548	285		
ND7103-4				90	227	200	89	131	172	131	182	355	175		
Red Pontiac				272	578	317	275	90	282	268	462	923	385		
BR6491-1								152	113						
BR6863-3								136	115						
BR7093-23										145					
BR7072-5										208					
Average				182	321	293	169	136	193	171	313	661			

North Central Table 3. Maturity classification^{1/}.

Variety	Late Early		Ind.	Ind.	Kansas	Mich.	Minn.	Mo.	Neb.	Neb.	N.D.	Ohio	Wisc.	Ave.
ND6925-13					3.0	2.0	2.5	1.3	2.0	2.5	2.0	2.6	2.0	2.2
ND7196-18					4.0	3.0	3.0	1.5	1.5	1.5	2.0	2.0	1.0	2.2
Norland					1.8	2.0	1.5	1.0	1.0	1.0	1.8	2.0	1.5	1.5
I. Cobbler					2.0	2.0	3.0	1.2	2.5	2.0	2.0	2.2	1.1	2.0
Norchip					4.8	2.5	3.5	2.2	2.5	2.5	2.3	2.7	3.0	2.9
<u>Med. to late</u>														
Neb 1.57-1					2.3	2.5	3.5	2.4	1.5	2.5	2.5	2.0	2.2	2.4
Neb 99.56-4					3.3	3.5	4.0	1.8	1.5	2.5	2.3	3.0	2.0	2.7
Neb 139.59-1					3.3	4.0	3.0	2.8	3.0	3.0	3.8	2.9	2.3	3.1
Ia 71-82					4.3	3.5	4.0	4.0	3.5	3.0	4.8	2.4	3.0	3.6
Ia 71-110					4.5	2.5	2.5	3.6	3.0	3.0	4.3	2.7	2.4	3.2
W623					4.3	3.5	3.0	3.0	4.0	3.0	3.5	3.3	2.3	3.3
W629					3.5	3.5	2.0	2.5	1.0	2.0	2.5	2.5	3.0	2.5
W710					3.5	3.0	2.0	2.8	2.0	2.5	3.3	3.2	3.7	2.9
Minn 3866					3.8	3.0	1.5	2.2	3.0	3.0	3.8	2.7	2.3	2.8
Minn 3915					3.8	2.5	2.0	2.5	3.5	3.0	3.0	3.1	2.4	2.9
Minn 3935					2.8	3.0	1.5	2.5	2.5	3.0	3.3	2.7	2.3	2.6
B6097-9					4.5	3.5	3.0	4.0	3.0	3.5	2.8	4.7	5.0	3.8
B6495-12					4.8	5.0	4.0	3.5	5.0	5.0	4.8	2.9	4.7	4.4
B6495-20					5.0	3.5	4.0	3.8	4.5	3.0	5.0	4.0	4.0	4.1
ND7103-4					2.8	2.5	2.5	2.4	2.0	1.5	2.0	2.8	2.8	2.4
Red Pontiac					5.0	4.5	3.0	3.5	2.0	4.0	4.5	4.4	4.0	3.9
BR6491-1									2.0	2.5				
BR6863-3									3.0	2.5				
B7093-23											4.5			4.5
B7072-5											4.5			4.5

^{1/} 1 = very early--Norland maturity

2 = early--Irish Cobbler maturity

3 = medium--Red Pontiac maturity

4 = late--Katahdin maturity

5 = very late--Kennebec or Burgess Burbank maturity

North Central Table 4. Total solids.

Variety	Late		Early		Kansas	Mich.	Minn.	Mo.	Late summer		Neb.	Late fall	N.D.	Ohio	Wisc.	Ave.
	Ind.	Ind.	Ind.	Ind.					Neb.	Neb.						
ND6925-13	15.2	19.1	19.1	16.7	17.1	20.5	20.5	20.5	17.1	17.3	22.7	19.6	16.7	18.4		
ND7196-18	15.4	18.8	18.8	15.6	17.5	18.4	18.4	20.5	18.6	16.8	20.7	17.6	16.5	17.9		
Norland	15.0	17.1	17.1	15.6	15.4	19.2	19.2	18.6	16.5	16.4	20.3	16.6	14.1	16.8		
I. Cobbler	15.9	20.1	20.1	18.4	18.0	21.2	21.2	20.7	19.4	18.1	21.4	18.1	15.8	23.0		
Norchip	16.6	20.5	20.5	17.5	19.2	21.8	21.8	21.6	19.4	18.8	22.4	16.6	17.7	23.6		
Med. to late																
Neb 1.57-1	15.4	18.1	18.1	16.9	17.3	20.5	20.5	21.6	18.0	17.7	22.0	17.9	15.4	18.3		
Neb 99.56-4	15.0	17.5	17.5	16.0	17.1	19.9	19.9	19.4	18.0	17.4	20.7	16.8	16.7	21.6		
Neb 139.59-1	15.1	18.0	18.0	14.1	16.7	20.1	20.1	18.2	15.4	18.2	19.7	16.7	16.5	17.2		
Ia 71-82	15.7	17.5	17.5	14.0	17.7	19.7	19.7	18.6	16.7	16.9	19.4	18.1	17.1	17.4		
Ia 71-110	15.0	19.0	19.0	13.1	16.7	20.1	20.1	16.9	15.0	15.9	19.4	17.2	15.2	16.7		
W623	17.4	21.3	21.3	16.5	19.4	20.9	20.9	20.9	18.0	18.2	23.3	19.4	18.2	19.4		
W629	15.8	19.9	19.9	17.2	17.3	20.5	20.5	19.2	18.0	17.2	23.3	17.7	16.0	18.4		
W710	15.0	16.0	16.0	13.3	15.4	18.4	18.4	16.2	15.6	15.3	19.7	16.2	13.3	15.9		
Minn 3866		20.8	20.8	18.8	19.0	22.9	22.9	21.6	19.2	19.8	23.1	18.3	18.2	20.2		
Minn 3915		18.8	18.8	17.0	17.7	20.9	20.9	18.6	17.7	18.2	22.4	17.5	15.8	18.5		
Minn 3935		18.5	18.5	15.4	16.2	19.9	19.9	19.4	18.0	16.9	20.7	16.7	15.6	17.7		
B6097-9	17.0	20.9	20.9	17.5	19.4	22.0	22.0	23.7	19.0	19.2	22.2	21.9	19.4	20.2		
B6495-12	16.4	20.2	20.2	16.2	20.5	22.2	22.2	22.0	17.7	19.4	20.3	19.7	19.4	19.5		
B6495-20	16.4	20.3	20.3	17.2	21.8	25.9	25.9	22.7	19.2	20.2	23.1	21.8	21.4	20.9		
ND7103-4	16.6	19.4	19.4	17.9	18.4	19.9	19.9	20.1	19.2	17.6	22.7	19.0	16.2	18.8		
Red Pontiac	15.0	17.3	17.3	14.8	17.8	18.4	18.4	17.1	15.2	16.7	18.6	15.9	16.2	16.7		
BR6491-1									19.7	20.5						
BR6863-3									19.2	20.2						
BR7093-23											20.9					
BR7072-5											22.0					
Average	15.8	19.0	19.0	16.2	17.9	20.6	20.6	19.9	17.8	18.0	21.3	18.1	16.7			

North Central Table 5. Scab reactions reported^{1/} (most representative scab--area type).

Variety	Late ^{2/} Early ^{2/}		Ind.	Ind.	Kansas	Mich.	Minn.	Mo.	Late		N.D.	Ohio	Wisc. ^{2/}
	Ind.	Ind.							summer Neb.	fall Neb.			
ND6925-13					1-1	1-1	0-0		T-1	1-3	T-1	1-1	
ND7196-18					1-1	1-5	0-0		T-1	T-4	1-1	0-0	
Norland					1-1	0-0	3-2		0-0	2-1	1-1	0-0	
I. Cobbler					2-1	1-5	2-2		T-4	1-4	2-1	0-0	
Norchip					2-1	0-0	2-1		T-3	0-0	T-1	0-0	
Med. to late													
Neb 1.57-1					1-1	0-0	0-0		0-0	1-2	1-2		
Neb 99.56-4					1-1	1-1	0-0		0-0	1-2	2-3	0-0	
Neb 139.59-1					1-1	1-1	3-3		0-0	0-0	3-3	3-2	
Ia 71-82					1-1	0-0	0-0		0-0	T-3	T-1	0-0	
Ia 71-110					1-1	1-5	0-0		1-3	2-3	T-1	0-0	
W623					1-1	1-5	0-0		T-4	2-4	1-1	0-0	
W629					1-1	1-5	0-0		0-0	1-2	T-1	0-0	
W710					1-2	0-0	0-0		1-2	0-0	T-1	0-0	
Minn 3866					2-1	1-4	0-0		0-0	3-5	2-2	0-0	
Minn 3915					1-1	1-3	0-0		0-0	2-4	1-1	0-0	
Minn 3935					3-1	0-0	0-0		1-4	0-0	1-1	0-0	
B6097-9					1-1	1-5	0-0		1-4	2-4	1-1	0-0	
B6495-12					1-1	0-0	0-0		0-0	1-5	1-1	0-0	
B6495-20					1-1	0-0	0-0		T-3	0-0	2-1	0-0	
ND7103-4					3-1	1-5	1-2		1-3	0-0	1-1	1-1	
Red Pontiac					2-1	1-5	2-3		0-0	2-1	2-1	0-0	
BR6491-1									T-3	T-2			
BR6863-3									T-3	3-5			
BR7093-23											1-1		
BR7072-5											T-1		

^{1/} Area

T = less than 1%

1-1 = 20%

2-21 = 40%

3-41 = 60%

4-61 = 80%

5-81 = 100%

Type

1 = small, superficial

2 = larger, superficial

3 = larger, rough pustules

4 = larger pustules, shallow holes

5 = very large pustules, deep holes

^{2/} No scab readings reported.

North Central Table 6. Summary of grade defects.

Variety	External				Total/ Free of Ext. Def.	Internal				Total <u>1</u> / Free of Int. Def.
	Scab	Growth Cracks	Second Growth	Sun Green		Hollow Heart	Internal Necrosis	Vascular Discolora- tion		
Early										
NND6925-13	1.8	4.3*	6.3*	1.6	87.1	5.3*	1.3	3.2	89.2	
ND7196-18	6.6	1.5	1.1	3.0	89.3	1.1	1.1	7.7	89.4	
Norland	3.1	1.0	1.9	1.5	93.3	0.4	0.1	4.5	94.4	
I. Cobbler	9.3*	1.2	2.6	4.0	85.3	1.8	2.9	6.7	87.1	
Norchip	2.8	2.2	4.2	4.1	87.6	0.5	2.0	3.2	92.7	
Med. to late										
Neb 1.57-1	3.9	1.5	1.2	4.5	90.3	0.5	0.7	0.8	95.5	
Neb 99.56-4	9.5*	2.3	5.3	2.3	84.3	1.3	6.4	2.5	90.5	
Neb 139.59-1	19.5*	2.8	1.3	1.1	81.4	3.2	7.9	1.5	86.4	
Ia 71-82	1.6	1.1	4.3	9.7*	83.5	1.1	4.6	9.6*	85.7	
Ia 71-110	5.3	2.3	1.1	3.5	89.5	2.5	3.9	4.9	87.8	
W623	5.4	2.9	1.7	2.3	89.2	1.0	0.6	4.7	92.4	
W629	2.3	0.0	0.7	1.1	96.5	0.2	0.1	1.0	98.5	
W710	4.9	1.0	5.1	3.5	86.9	2.1	0.1	5.4	87.6	
Minn 3866	8.0*	1.6	1.0	2.3	80.9	0.3	0.8	1.6	96.4	
Minn 3915	4.4	1.0	10.0*	4.5	80.3	0.7	0.7	9.7*	87.4	
Minn 3935	3.1	3.6*	2.1	1.3	90.6	0.2	0.6	3.4	95.3	
B6097-9	7.0*	2.1	4.6	6.7	82.8	0.1	9.5*	4.9	87.8	
B6495-12	2.9	0.6	6.5*	2.4	88.5	2.5	5.5	5.4	86.6	
B6495-20	3.0	3.8*	3.9	2.7	87.4	1.6	3.5	6.8	89.2	
ND7103-4	7.3*	2.1	2.1	3.0	88.2	0.2	4.7	5.8	87.6	
Red Pontiac	10.8*	1.2	7.8*	2.5	81.1	2.4	1.4	5.7	88.6	

1/ Percent normal tubers showing no defects (some individual tubers had more than one type of defect).

* Possible weakness of a variety.

North Central Table 7. Merit ratings 1/

Variety	Late Ind.	Early Ind.	Kansas	Mich.	Minn.	Mo.	Late summer Neb.	Late fall Neb.	N.D.	Ohio	Wisc.	Total Points
<u>Early</u>												
ND6925-13 Russ							4	3				7
ND7196-18		3				2			5		3	13
Norland				4	1							5
I. Cobbler												0
Norchip	3	1	1					4		1		10
<u>Med. to late</u>												
Neb 1.57-1				1		3	2	1				7
Neb 99.56-4												0
Neb 139.59-1												0
Ia 71-82			2									2
Ia 71-110			5				1					9
W623	2		4	2			3		4	2	1	24
W629	1		3	3						3	5	15
W710				5		1					2	5
Minn 3866												14
Minn 3915												0
Minn 3935												10
B6097-9	5	5			5		5					26
B6495-12		4				5		5	1	5		8
B6495-20	4									4		4
ND7103-4												2
Red Pontiac		2						2				4

-34-

1/ Merit points determined as follows:

Merit Rating	Merit Points
1	5
2	4
3	3
4	2
5	1

North Central Table 8. Chip quality

Variety	Kansas	Michigan ^{1/}	Late ^{1/} summer Nebraska	Late ^{1/} fall Nebraska	No. Dakota ^{2/}	Wisconsin ^{3/}
ND6925-13 Russ	poor	6	6	5	31	70
ND7196-18	good	3	2	3	34	77
Norland		7	2	3	36	71
I. Cobbler	good	6	2	4	34	71
Norchip	excellent	2	3	2	44	74
<u>Med. to late</u>						
Neb 1.57-1	good	4	2	2	43	72
Neb 99.56-4	good	5	2	1	40	70
Neb 139.59-1		5	6	3	37	70
La 71-82	excellent	3	6	3	32	72
La 71-110	good	5	7	3	28	70
W623	good	3	4	3	37	76
W629	excellent	2	3	1	46	77
W710	poor	4	3	3	24	70
Minn 3866		6	7	3	29	70
Minn 3915	poor	7	6	4	26	70
Minn 3935		8	3	3	36	70
B6097-9	poor	6	6	4	23	70
B6495-12		7	7	5	26	74
B6495-20	poor	4	4	3	27	73
ND7103-4		2	2	1	47	73
Red Pontiac		9	7	4	18	70
BR6491-1			4	2		
BR6863-3			1	1		
BR7093-23					30	
BR7072-5					24	

^{1/} Chip color PCII values (the lower the number the lighter colored the chip).

^{2/} Agtron--the higher the number the lighter the chip.

^{3/} Chip score--80 or more is acceptable.

ALABAMA

J. L. Turner, Harrison Bryce and Hubert Harris - Auburn University
Frank E. Garrett - Gulf Coast Substation
S. E. Gissendanner and John Eason - Sand Mountain Substation

Irish Potato Variety Trial, Sand Mountain Substation
Crossville, Alabama

Experimental Procedure. Six named varieties and 32 numbered selections from Louisiana, Wisconsin, USDA, and Frito-Lay Company were grown in replicated plots at the Sand Mountain Substation, Crossville, Alabama. Seedpieces were cut to approximately 1-1/2 ounces each, treated for rot control and planted on March 13. Fertilizer was applied as 600 pounds of 8-24-24 broadcast prior to planting with 236 pounds of NH_4NO_3 plus 25 pounds of magnesium as a sidedress 30 days after planting. Plots were dug June 29. Potatoes were graded into sizes A and B for yield data. Samples of each variety and breeding line were returned to Auburn for laboratory analysis.

Results. Growing conditions were favorable this year for potatoes in the mountain section of Alabama. Yields were considerably better this year than for 1971. Lines B6595-5, B6987-56, Wisconsin 709, and Wisconsin 710 produced the largest total yields of marketable potatoes. These lines produced over 200 cwt. per acre. Wisconsin 710 also had excellent eye appeal along with Frito-Lay 162. Line 122-111 had a very dark red skin. Lines B6967-9 and B7005-3 had light pink or rose-colored skin. Plant vigor was good to excellent for all entries.

Chip quality and other related factors are presented in Table 2. Wisconsin 629 and B7024-4 had the highest chip color rating. Lines B6987-56 and B6516-26 had the highest specific gravity.

Alabama Table 1. Potato variety trial, Crossville, Alabama--1972

Variety	Yield Per Acre			Eye		Skin	Shape	Eye
	No. 1	No. 2	Total	depth	Size			
	Cwt.	Cwt.	Cwt.	1/	2/	3/		4/
Superior	124.78	30.87	155.65	D	M	Wh	Rd./flat	4
Kennebec	154.33	21.07	175.40	S	S	Wh	Rd./long	4
Norchip	— 76.82	37.79	114.61	M	S	Wh	Round	4
La Chipper	102.40	36.55	138.95	S	S	Wh	Round	4
Red La Soda	118.65	27.68	146.33	D	L	Red	Round	4
Frito-Lay 162	107.84	36.31	144.15	S	S	Wh/SR	Round	5
Frito-Lay 282 (Seminole)	124.63	15.55	140.18	S	S	Wh	Round	3
Frito-Lay 96	144.31	33.98	178.29	S	S	Wh	Round	3.5
I22-110	149.05	26.90	175.95	M	S	Wh	Rd./flat	4
I22-111	102.48	22.86	125.34	M	M	Dark Red	Round	3.5
Wis. 664	149.51	31.26	180.77	D	M	Wh	Rd./flat	2.5
Wis. 623	109.94	45.64	155.58	S	S	Wh	Round	4
Wis. 629	94.00	48.99	142.99	S	S	Wh	Round	3
Wis. 708	138.47	27.21	165.68	D	M	Wh	Rd./long	4
Wis. 709	182.87	24.42	207.29	S	S	Wh/SR	Rd./long	4.5
Wis. 710	173.38	31.80	205.18	S	S	Wh	Rd./long	5
B5665-7	90.74	30.79	121.53	S	M	Wh	Long	3.5
B5698-8	91.28	28.69	119.97	S	S	Wh	Round	4
B6495-12	148.03	41.60	189.63	S	M	Wh	Long/flat	4
B6503-5	108.85	15.48	124.33	S	S	Wh	Long	4
B6516-3	102.16	24.42	126.58	S	S	Wh	Round	3.5
B6567-12	179.84	18.97	198.81	D	M	Wh	Long	3.5
B6595-5	193.68	23.56	217.24	S	M	Wh	Round	3.0
B6603-6	138.63	23.79	162.42	D	L	Purple	Round	1
B6603-12	85.22	68.97	154.19	M	M	Wh	Long	3
B6967-8	153.64	24.65	178.29	M	L	Pink	Round	3
B6967-9	115.93	39.65	155.58	M	M	Rose	Round	3
B6987-22	106.36	28.30	134.66	S	S	Wh/SR	Round	4
B6987-37	117.79	21.07	138.86	S	S	Wh	Rd./flat	4
B6987-54	137.46	17.65	155.11	S	S	Wh/SR	Long	4
B7005-3	116.62	22.94	189.56	S	S	Pink	Round	3
B7024-4	119.81	27.60	147.41	M	S	Wh	Round	3.5
B7024-6	137.55	30.71	168.26	S	S	Wh	Long	4
B6516-26	131.16	25.04	156.20	S	S	Wh/SR	Long	4
B6532-4	159.00	22.16	181.16	S	S	Wh	Rd./flat	3.5
B6562-14	127.43	34.60	162.03	S	S	Wh/SR	Rd./flat	4
B6515-14	169.73	29.39	199.12	M	M	Red	Round	3
B6987-56	186.29	28.69	214.98	M	S	Wh/SR	Round	4.5

1/ S = Shallow; M = Medium depth; D = Deep

2/ S = Small; M = Medium; L = Large

3/ Wh = White; SR = Some Russet

4/ 1 = Poor; 5 = Excellent

Alabama Table 2. Quality and processing evaluations, Crossville, Alabama--1972 ^{1/}

Variety	Raw tuber properties ^{2/}		Potato chip properties	
	Specific gravity	Total solids	Chip weight ^{3/}	Chip color
	1.0 omitted	Pct.	grams	^{4/}
Superior	836	20.9	174	8.9
Kennebec	803	20.3	166	6.1
Norchip	836	20.9	163	6.8
La Chipper	821	20.6	162	6.1
Red La Soda	705	18.2	154	5.3
Frito-Lay 162	818	20.6	173	5.3
Seminole	856	21.4	175	7.3
Frito-Lay 96	819	20.6	166	6.6
I22-110	718	18.5	153	5.6
I22-111	764	19.5	155	4.4
Wis. 664	860	21.5	164	6.1
Wis. 623	774	19.7	167	7.0
Wis. 629	784	19.9	166	9.3
Wis. 708	845	21.2	167	8.4
Wis. 709	671	17.5	146	5.1
Wis. 710	713	18.4	158	4.8
B5665-7	805	20.3	176	6.1
B5698-8	698	18.1	156	8.1
B6495-12	816	20.5	165	5.9
B6503-5	860	21.5	177	8.7
B6516-3	854	21.4	180	6.1
B6567-12	741	19.0	157	4.5
B6595-5	841	21.0	168	6.2
B6603-6	859	21.5	178	6.0
B6603-12	860	21.5	174	8.5
B6967-8	778	19.8	167	7.6
B6967-9	770	19.6	159	7.0
B6987-22	835	20.9	163	6.1
B6987-37	856	21.4	164	6.3
B6987-54	835	20.9	167	6.5
B7005-3	729	18.8	161	5.1
B7024-4	811	20.4	169	9.1
B7024-6	820	20.6	170	8.6
B6516-26	928	22.9	177	6.5
B6532-4	820	20.6	163	4.9
B6562-14	841	21.0	169	4.9
B6815-14	651	17.0	148	3.6
B6987-56	941	23.1	179	7.0

- ^{1/} Mean of tests on samples from four randomized plots grown at Sand Mountain Substation, Crossville, Alabama. Potatoes were planted March 13, dug June 29, stored at 60° F for approximately two weeks before processing.
- ^{2/} Determined by standard specific gravity method.
- ^{3/} Weight of chips from 454 grams prepared slices (washed, friction peeled, sliced 1/20", washed, centrifuged, fried 2.5 to 3 min. 350° F down to 325° F, drained).
- ^{4/} Based on scale of 1 as very dark and unacceptable to 6 as barely acceptable to 10 as very bright and highly acceptable.

ALASKA

Curtis H. Dearborn

Our planting season ran from May 28 to June 16 due to wet, cold soil conditions. Soil moisture for normal growth lasted until August 10. From then on non-irrigated potatoes were very dry. Field frosting destroyed the vines September 15 and 16, 1972.

Tuber families (4-16 clones) of 34 species represented by 119 samples were obtained from IR-1 stocks of P.I. numbered clones. These 34 species planted June 8 were: S. acaule, S. acroglossum, S. acroscopicum, S. ambosinum, S. boliviense, S. brachycarpum, S. canasense, S. cardiophyllum, S. chacoense, S. chancayense, S. clarum, S. demissum, S. fendleri, S. hjertingii, S. huancabambense, S. immitis, S. infundibuliforme, S. medians, S. megistacrolobum, S. multidissectum, S. phureja, S. raphanifolium, S. sanctae-rosae, S. sogarandinum, S. spigazzinii, S. stenotomum, S. stoloniferum, S. toralapanum, S. tuberosum ssp. andigena, S. venturii, S. vernei, S. verrucosum, S. violaceimarmoratum, S. weberbaueri. Harvest was delayed until early October to permit those that withstood frosting to continue growth. These species were: S. acaule, S. demissum, and S. multidissectum. Tubers were found only on S. phureja, S. sanctae-rosae, S. stoloniferum, and S. tuberosum ssp. andigena. It was a very short growing season for small tubers planted this late. Much genetic variation in plant type, leaf character, flower color and seedball formation was noted.

Four replications of 48 varieties and seedling clones were harvested August 18 to determine their merits for early production. Eleven clones; Alaska 114, Cariboo, Iopride, Kennebec and seven Alaska clones yielded at the rate of 100 or more cwt/A. Iopride was 143, Kennebec 113 and three Alaska clones were 119, 120 and 121 cwt/A. Clone Ak. 5, a red-skinned selection yielded 83 cwt. which was more than double that of Chieftain.

Four replications of 66 varieties and seedling clones were harvested September 21 for yield and chipping characteristics.

Eight clones exceeded the productivity of Green Mountain which was 269 cwt/A of 2 to 3½ inch tubers. Clone Ak. 3-58-35-68, a desirable processing type produced at the rate of 281 cwt. and Ak. 5, a smooth red yielded at the rate of 327 cwt/A. Acceptable commercial grade chips have been made frequently since harvest from new selections held continually at 48 to 50° F.

We have detected, in chips of two imported clones, the bitterness that we detected in B-5141-6 in earlier years. These were B-6515-10 (B-3627-18 x B-5141-6) and BR-6820-29 (Wauseon x B-3819-17). In addition the objectionable flavor was detected in a selection from Ak. 14-58-6-60 x B-5141-6 and in a selection from Ak. 1-62-90-64 x B-5141-6.

Specific gravity readings for most clones were .008 to .014 higher than in a wet season. Clones that were under 1.095 just did not have the genetic potential to store at a higher ratio.

Three series of B numbered potato seedlings from Beltsville were grown and evaluated for tops and tubers. The series B-9196 through B-8304 (fourteen pedigrees) were definitely more sensitive to rhizoctonia than seedlings from the Alaskan crosses. Of course, their parentages were quite different also.

Clone B-7623-1 of another series has an irregular pattern of scar tissue of the leaves of all plants which David Wilson of Aroostook Farms, Maine, writes is common to this clone in Maine, also.

Iopride under our conditions carries some genetic factor in its apical region that permits stem elongation at a very constant rate following emergence and until it is 14 to 18 inches tall. Rossetting, which is undesirable, takes place in other clones in response to light directly following emergence.

CALIFORNIA

R. E. Voss, J. C. Bishop, K. G. Baghott, D. N. Wright, W. A. Wright

In 1972, over 100 seedlings and named varieties were grown and evaluated at six sites in California, but not all entries were grown at all locations. Seed potatoes were obtained from the breeding programs in Washington, Idaho, Colorado, and Beltsville (grown in Maine), from the Western Regional trials in Aberdeen, and from foundation stock at California Stockton Delta.

Table 1 summarizes the averages of several yield and quality components from sites 1-5. Sites 1, 2, and 3 were in Kern County, site 4 was at Davis, and site 5 was at Tullake. Site 6 was in Humboldt County, and only a few chipping varieties were grown there.

Table 2 summarizes the data from site 6. Table 3 lists the top seedlings from the various sites based only on No. 1 yield, percent No. 1's, specific gravity and a visual tuber rating taken at harvest. Each category was rated on a 1-5 scale, with 1 being very poor and 5 very good. Minimum requirements for a 4 rating in each category were 300 cwt/A, 81%, 1.081, for No. 1 yield, percent No. 1's, and specific gravity, respectively.

A primary objective of the California program is to find a russet that will be satisfactory in the San Joaquin and other hot interior valleys for spring and summer harvest. The current primary market is fresh market, but processing potential is also of interest.

The russets with the most promise appear to be WC285-18, WC316-1, WC316-3, WC325-1, WC330-7, WC285-141, WC284-7, WC285-110, WC285-20, Wn168-3, A63126-2, A64187-4, B7583-6, B7483-15, B7683-6, and B7781-13.

The top whites for chipping were A503-42, BR5960-5, BC7222-5, BR6316-5, Cascade M, in addition to Norchip, Monona and Shurchip.

The two top reds were Norchief and DT6063-IR.

The trial in Humboldt County produced some revealing information on late blight susceptibility. This coastal area has a high frequency of blight infestation. Cascade M, a selection by Dr. William Hoyman from a verticillium trial, was very tolerant, or perhaps even resistant to late blight infestation. In contrast, Cascade was very susceptible, as were Monona, BR5960-5, A503-42, Shurchip and Norchip. Kennebec was intermediate.

California Table 1. Yield and quality measurements and ratings from five California locations.

Variety or Seedling No.	Sites Grown	1/ l's	1's ² / Cwt/A	% l's	Ave. Wt. Of l's, Oz.	S.G. ³ / l's	Chip Color ⁴ / SR		Vine ⁵ / Rating	Tuber ⁶ / Rating		Overall ⁷ / Rating
							H			Rating		
A503-42	1-5	1-5	420	85	7.1	82	5.8	6.4	4.1	3.8		4.2
A6305-20	1-5	1-5	265	84	6.5	77			2.7	2.4		3.1
A6334-19	1-5	1-5	285	84	6.6	81	7.0	8.0	3.8	3.0		3.5
A6382-10	1-5	1-5	260	74	6.7	90			3.6	2.2		3.3
A63126-2	1-5	1-5	345	87	7.1	84	6.4	8.0	4.1	4.0		4.0
A63126-9	1-5	1-5	310	75	8.8	84	8.5	8.0	4.1	2.0		3.2
A6477-4	1-5	1-5	295	76	6.2	79			3.9	3.0		3.0
A64187-4	1-5	1-5	450	87	9.7	82	6.0	8.0	4.1	3.0		4.0
A64206-4	1-5	1-5	255	74	6.5	86	7.2	7.5	4.0	2.8		3.4
A6698-4	1-5	1-5	260	83	5.9	82	8.0	9.0	3.6	3.4		3.6
A66107-75	1-5	1-5	355	74	7.1	77			4.1	2.0		3.0
A66107-101	1-5	1-5	235	76	6.3	82	8.0	9.0	3.0	2.8		3.0
A66107-169	1-5	1-5	285	67	7.8	75			3.2	1.6		2.4
A66107-197	1-5	1-5	315	87	7.1	82			3.6	2.2		3.6
A66110-25	1-5	1-5	340	78	9.2	91	7.0	8.0	4.1	2.0		3.5
A66122-3	1-5	1-5	285	66	4.9	84	6.8	8.0	4.0	2.4		2.8
BR5960-5	1-5	1-5	460	87	9.2	80	5.2	6.6	4.0	3.6		4.2
BR6316-5	1-5	1-5	330	91	7.9	82	4.5	8.3	3.6	3.4		4.1
NDA7697-2	1-5	1-5	330	75	9.9	73			3.5	2.2		2.8
NDA7698-1	1-5	1-5	295	84	7.9	72			3.4	2.6		2.9
B6044-14	1-4	1-4	355	84	10.1	82			3.9	1.2		3.3
B7147-17	1-5	1-5	295	77	7.6	89	6.0	9.0	4.0	2.0		3.2
B7147-36	1-5	1-5	305	79	8.0	75	7.0	8.0	3.4	2.6		3.2
B7147-37	1-5	1-5	140	63	5.2	78	5.0	9.0	3.0	2.4		2.1
B7196-4	1-5	1-5	240	76	7.4	73			3.5	3.2		2.6
B7196-40	1-5	1-5	250	79	7.7	79	7.5	8.0	3.1	3.4		3.1
B7196-56	1-5	1-5	340	87	8.3	77	5.0	9.0	3.4	2.4		3.4
B7196-64	1-5	1-5	220	78	7.2	85	4.7	7.7	3.6	3.4		3.1
B7200-6	1-5	1-5	395	87	7.6	78			3.8	2.4		3.4
B7583-6	3-4	3-4	470	95	9.1	92	4.5	6.5	4.0	3.0		4.5
B7583-15	3-5	3-5	325	87	7.6	86	5.0	7.8	3.6	2.7		3.9

Table 1. (Continued)

Variety or Seedling No.	Sites/ Grown	1's/ 2/ 1's/ Cwt/A	% 1's	Ave. Wt. Of 1's, Oz.	S.G. 3/	Chip Color		Vine 5/ Rating	Tuber 6/ Rating	Overall 7/ Rating
						H	SR			
B7584-10	3-4	185	68	7.8	86	4.0	6.0	2.5	2.0	2.5
B7607-3	3-4	155	54	5.9	75	6.0	9.0	3.1	2.0	1.8
B7608-2	3-4	325	78	7.5	77			3.1	2.0	3.0
B7625-19	3-4	340	76	10.0	74			3.6	2.0	2.8
B7631-7	3-4	310	82	7.2	70			2.9	1.0	2.8
B7636-6	3-4	160	80	5.8	79	6.0	9.0	2.0	2.0	2.2
B7636-9	3-4	240	80	6.4	86	8.0	9.0	3.0	2.5	3.1
B7637-5	3-4	320	86	7.1	82			3.0	1.5	3.4
B7655-3	3-4	335	82	6.7	73			3.2	2.0	3.0
B7655-9	3-4	370	88	7.0	72			3.2	2.0	3.0
B7656-6	3-4	190	84	6.0	73			2.7	1.5	2.1
B7660-6	3-4	275	82	7.0	83	7.0	10.0	3.0	2.5	3.4
B7663-15	3-4	350	83	7.4	78			3.1	2.0	3.2
B7677-2	3-4	305	76	9.6	78			3.0	2.0	3.0
B7678-2	3-4	270	67	7.5	76			2.9	2.0	2.5
B7678-13	3-4	450	87	8.5	72			3.6	2.0	3.2
B7679-8	3-5	380	86	7.9	76			3.4	2.0	3.2
B7683-6	3-4	385	95	7.7	78	8.0	10.0	3.1	3.0	3.8
B7684-5	3-4	360	79	10.1	73			3.5	2.0	2.8
B7711-2	3-4	290	86	7.1	75			3.0	2.0	2.8
B7732-2	3-4	450	79	12.6	83	4.0	9.0	4.1	2.0	3.5
B7778-1	3-4	280	87	6.8	70	6.0	10.0	2.6	2.5	2.6
B7781-13	3-4	395	90	8.8	80			3.9	4.0	3.8
WC230-14	1, 3-5	280	83	8.1	75			4.0	2.5	2.9
WC283-8	3-5	330	72	8.2	72			4.0	2.0	2.8
WC284-7	1, 3-4	340	83	6.9	81	5.7	8.0	4.0	3.3	3.8
WC284-20	3-4	455	82	11.4	67			4.2	3.0	3.2
WC285-9	3-5	290	76	9.2	72			4.2	2.0	2.5
WC285-18	1, 3-5	400	87	10.1	82	6.6	9.2	4.1	3.8	4.2
WC285-20	1-4	310	91	9.8	77			4.0	3.2	3.8
WC285-83	1, 3-5	345	78	10.9	84	4.8	7.2	4.1	3.0	3.5
WC285-85	1-5	270	87	7.0	84	5.3	7.5	4.2	3.0	3.5
WC285-110	3-5	415	79	11.4	92	7.0	8.0	4.5	2.3	3.8

Table 1. (Continued)

Variety or Seedling No.	Sites Grown	1's Cwt/A	1's %	Ave. Wt. Of 1's, Oz.	S.G. 3/	Chip Color		Vine Rating	Tuber Rating	Overall Rating
						H	SR			
WC285-141	1, 3-5	395	85	10.4	82	5.4	8.0	4.1	3.8	4.0
WC285-146	1, 3-5	390	84	10.4	76	7.0	10.0	4.0	3.0	3.5
WC300-4	3-5	415	72	9.9	80			4.4	2.0	3.2
WC302-7	3-4	215	65	7.8	76			3.0	1.5	2.1
WC304-4	3-5	460	83	11.4	72			3.9	2.0	3.2
WC314-2	3-5	370	77	10.4	84	7.0	9.5	3.9	2.3	3.3
WC314-3	3-5	420	83	10.7	79	7.0	9.5	3.9	2.7	3.7
WC315-1	3-5	315	73	9.4	63			3.9	1.7	2.4
WC316-1	3-5	420	92	12.4	77	7.0	9.0	4.0	3.3	4.1
WC316-3	3-5	480	88	8.3	81	6.7	9.7	4.0	3.3	4.1
WC325-1	3-5	420	81	12.1	87	6.0	10.0	4.0	2.3	4.1
WC325-5	3-5	475	80	10.7	85			4.5	1.7	3.4
WC330-4	3-5	325	64	8.7	89	6.0	9.0	4.2	1.7	3.2
WC330-7	3-5	370	87	9.7	87	5.8	9.0	4.0	3.3	4.1
BC7163-6	3-5	385	82	7.2	74			3.2	2.7	3.2
BC7204-14	3-5	407	60	8.8	68			4.1	1.7	2.2
BC7222-5	3-5	500	89	9.0	84	6.2	7.7	4.0	4.0	4.2
BC7222-30	3-5	355	80	9.8	76			3.4	2.3	3.1
BC7257-2	3-5	280	57	6.8	92	5.5	7.5	4.1	1.7	2.7
BC7358-1	3-5	475	69	12.2	76			3.9	2.0	3.0
DT6063-IR	1-5	325	89	9.1	83	5.6	8.2	4.0	3.4	3.8
Wn168-3	1-5	325	90	6.6	93	5.2	7.6	4.2	4.0	4.2
Wn284-1	1-5	250	88	8.0	78			3.9	2.4	3.1
ND6993-13	3-5	190	53	6.3	79			4.0	1.7	1.7
ND7003-2	3-5	255	81	6.7	63			3.0	3.0	2.8
Cascade	1-5	340	91	8.4	75			3.8	3.6	3.6
Cascade M	1-6	465	86	9.4	78	5.0	9.5	4.0	3.6	3.9
Chieftain	3-5	385	90	9.3	72	6.0	9.2	4.2	3.3	3.3
Kennebec	2-5	375	80	8.0	81	4.4	7.6	4.4	3.2	3.6
Norchief	3-5	420	86	7.4	76			4.2	4.0	4.0
Norchip	3-5	325	77	6.0	86	4.2	6.0	4.0	3.3	3.8
Nor. Russet	3-5	330	85	6.8	72			4.0	3.3	3.3

Table 1. (Continued)

Variety or Seedling No.	1/ Sites Grown	2/ 1's Cwt/A	% 1's	Ave. Wt. Of 1's, Oz.	3/ S.G.	4/ Chip Color		5/ Vine Rating	6/ Tuber Rating	7/ Overall Rating
						H	SR			
Monona	5	400	89		73	4.5	5.0		4.0	3.8
Pioneer	1-5	345	87	9.1	78			3.4	2.4	3.4
Red La Soda	2-5	405	85	7.7	74			4.1	2.8	3.4
Rus. Burbank	3-5	230	65	5.6	86	5.8	8.0	4.1	2.3	2.8
Shurchip	3-4	400	86	7.7	78	4.5	7.0	4.1	3.0	3.8
Sioux	3-5	350	84	6.1	85			4.1	2.3	3.6
Viking	3-5	395	90	10.4	75			4.1	3.7	3.4
Wh. Rose	1-5	305	67	9.0	76	7.0	8.0	4.0	2.8	3.0

1/ 1-3 Kern County, 4 Davis, 5 Tulelake.

2/ Greater than 2" diameter.

3/ 1.0 omitted (e.g. 82 is 1.082).

4/ NPCI color chart: H = color at harvest, SR = color after 60 days at 45° F and reconditioned for 15 days at 65° F.

5/ Vigor and size rating: 1 = very poor, 5 = exceptionally good.

6/ Visual rating at harvest: 1 = very poor, 2 = unacceptable, 3 = questionable, 4 = good, 5 = outstanding.

7/ Average of ratings for No. 1 yield, % No. 1's, specific gravity and tuber rating.

California Table 2. Yield, specific gravity, chip color and late blight index for several chipping varieties grown in Humboldt County.

Variety or Seedling	Seed Source	Mktble. Yield		Spec. ^{1/} Grav.	Chip Color ^{2/}		Blight Index ^{3/}	
		9"	12"		H	SR	60 Dys	85 Dys
A503-42	Idaho	275	320	96	5	4	2-	8
BR5960-5	Idaho	230	230	97	4-	7	3+	9
Cascade	Idaho	330	245	85	5	10	1-	9
Cascade M	Wash.	420	505	90	5	9.5	0	1
Kennebec	Delta	290	280	84	4	5.5	1	5
Kennebec	Idaho	385	335	87	4	6	1+	5
Monona	Idaho	180	140	89	4	4-	2	10
Norchip	Idaho	215	335	87	4-	4	2+	7
Norchip	Delta	200	150	94	4-	5	2	7
Shurchip	Delta	250	215	88	4	6	1+	8

^{1/} 1.0 omitted (e.g., 96 = 1.096)

^{2/} NPCI color chart; 1 = white, 10 = black (6 maximum acceptable color),
H = color at harvest, SR = color after storage and reconditioning.

^{3/} Blight index: 1 = few lesions, 10 = dead.
60 and 85 dys are days after emergence.

California Table 3. Top seedlings and varieties based on yield of No. 1's, percent No. 1's, specific gravity and visual tuber rating.

Variety or Seedling No.	No. 1's ^{2/} Cwt/A	% No. 1's	Spec. ^{3/} Grav.	Tuber ^{4/} Rating	Overall ^{5/} Rating
B7583-6 ^{1/}	470	95	92	3.0	4.5
A503-42	420	85	82	3.8	4.2
BR5960-5 ^{1/}	460	87	80	3.6	4.2
WC285-18 ^{1/}	400	87	82	3.8	4.2
BC7222-5 ^{1/}	500	89	84	4.0	4.2
Wn168-3	325	90	93	4.0	4.2
BR6316-5 ^{1/}	330	91	82	3.4	4.1
WC316-1 ^{1/}	420	92	77	3.3	4.1
WC316-3 ^{1/}	480	88	81	3.3	4.1
WC325-1 ^{1/}	420	81	87	2.3	4.1
WC330-7 ^{1/}	370	87	87	3.3	4.1
A63126-2	345	87	84	4.0	4.0
A64187-4 ^{1/}	450	87	82	3.0	4.0
WC285-141 ^{1/}	395	85	82	3.8	4.0
Norchief	420	86	76	4.0	4.0
Cascade M ^{1/}	465	86	78	3.6	3.9
B7583-15 ^{1/}	325	87	86	2.7	3.9
B7683-6 ^{1/}	385	95	78	3.0	3.8
B7781-13 ^{1/}	395	90	80	4.0	3.8
WC284-7 ^{1/}	340	83	81	3.3	3.8
WC285-110 ^{1/}	415	79	92	3.8	3.8
DT6063-IR	325	89	83	3.4	3.8
Norchip	325	77	86	3.3	3.8
Shurchip	400	86	78	3.0	3.8
Monona ^{1/}	400	89	73	4.0	3.8
WC285-20 ^{1/}	310	91	77	3.2	3.8

^{1/} Data not from replicated plots.

^{2/} Greater than 2" diameter.

^{3/} 1.0 omitted (e.g. 82 is 1.082).

^{4/} NPCI color chart; H = color at harvest, SR = color after 60 days at 45° F and reconditioned for 15 days at 65° F.

^{5/} Vigor and size rating: 1 = very poor, 5 = exceptionally good.

COLORADO

James A. Twomey

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Seedling Program: Approximately 15,000 first year seedlings were grown in 1972. Seedlings were obtained from Dr. Raymon E. Webb, Beltsville, Maryland; and Dr. William G. Hoyman, Prosser, Washington. The seedlings grown in 1972 were from crosses which produced primarily russet types.

Seedlings were planted the first week in May and harvested the second week in September. Approximately 230 first year seedlings were selected for testing in 1973. From 187 second year seedling, 17 were selected for further testing. Fourteen advanced seedlings are being increased and tested for fresh market and processing qualities.

Thirty-five varieties and advanced seedlings were tested for specific gravity and chip color, and these data may be found in Table 1.

Yield Trial: Nineteen varieties and advanced seedlings were included in the 1972 yield trial. Plots were planted May 4 on fall-plowed alfalfa ground. Each plot was two rows, 30 ft. long and 34 inches apart, with 12-inch spacing in the row. Fertilizer (18-46-0) was applied four inches below the seedpiece at planting at the rate of 430 lbs/A. Each selection was replicated four times, and harvest date was September 22. Data for the yield trial may be found in Table 2.

Colorado Table 1. Chip color^{1/} and specific gravity^{2/} of 1972 advanced seedlings.

Clone	Specific Gravity	Harvest Color	3 Wk's 70° Color	10Wk's 40°		10Wk's 50°	
				1Wk 70° Color	3Wk's 70° Color	1Wk 70° Color	3Wk's 70° Color
WL68-3	1.092	41.0	28.0	15.0	19.5	16.0	22.5
WC316-7	1.093	31.0	25.0	16.0	19.0	19.0	22.0
BC7805-9	1.096	43.0	33.0	15.5	25.0	21.0	30.0
WC326-3	1.092	39.0	22.0	7.5	15.0	14.0	16.0
WC345-14	1.099	41.0	36.0	22.0	25.0	17.0	31.0
BC7635-2	1.090	38.5	36.0	18.0	19.0	16.5	25.0
BC7602-1	1.102	42.5	38.0	23.5	26.0	26.0	32.0
BC7021-1	1.088	43.0	30.0	23.0	24.0	24.5	29.0
BC7812-1	1.089	21.0	23.0	10.0	12.0	15.0	14.0
BC7679-4	1.086	30.0	15.0	12.0	14.0	12.0	13.0
WC331-1	1.087	32.0	27.0	15.0	15.0	14.5	16.5
WC300-4	1.096	26.0	18.0	7.0	13.5	16.5	17.0
BC7632-1	1.100	26.0	25.5	18.0	14.0	15.5	18.0
WC345-15	1.098	37.0	32.5	28.0	26.0	26.5	28.0
WC325-1	1.114	38.0	28.5	12.0	26.0	16.0	23.0
Oromonte	1.088	32.0	32.0	22.5	22.0	23.0	33.0
WC315-1	1.090	30.0	34.0	9.0	11.5	11.0	13.0
WC285-141	1.086	37.0	26.0	13.5	18.0	15.0	12.0
WC285-146	1.085	28.0	23.5	6.0	10.0	8.5	12.0
WC316-1	1.087	32.0	37.5	10.0	14.5	12.5	17.0
WC304-4	1.081	32.0	36.0	5.0	10.0	9.5	12.5
WC314-2	1.093	32.0	35.0	7.0	17.0	15.0	16.0
WC284-7	1.083	31.5	34.0	11.0	12.0	14.0	18.5
WC284-20	1.079	32.0	29.0	10.5	14.0	12.0	15.0
WC285-18	1.088	31.0	27.0	10.0	15.0	12.0	15.0
WC285-85	1.092	40.0	35.0	21.5	19.0	19.0	25.5
WC285-83	1.091	32.5	36.0	19.5	20.0	20.0	22.5
BC7163-2	1.082	34.0	26.0	21.0	25.0	20.5	32.0
BC7010-2	1.083	24.5	30.0	7.0	15.0	14.0	17.5
WC283-8	1.080	20.0	26.0	8.0	13.0	10.0	13.0
BC7222-5	1.085	34.0	20.0	11.0	14.0	20.0	23.0
B5141-6	1.106	41.0	36.0	27.0	31.5	31.0	32.5
Abnaki	1.090	36.0	30.0	12.0	15.0	18.0	24.0
Norchip	1.083	38.0	36.0	20.0	29.0	30.5	33.0
Jewel	1.089	32.5	34.0	23.0	25.0	28.5	31.0

^{1/} Chip color determined with Photovolt reflectance meter. Color readings of 25 or above acceptable.

^{2/} Specific gravity determined by potato hydrometer.

Colorado Table 2. Total yield & grade for variety trial.

	Yield Per Acre						U. S. No. 1	U. S. No. 1
	U. S. No. 1 4-10 oz.	>10 oz.	U. S. No. 2	Culls	B size <4 oz.	Total	U. S. No. 1	
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Pct.
WC285-141†	183.3	215.8	21.5	2.8	12.5	435.7	398.8	91.5
WC285-146†	256.3	78.8	9.5	0.5	26.4	371.5	335.1	90.2
WC283-8†	172.3	44.5	19.5	1.0	38.4	275.5	216.8	78.4
WC284-7†	203.0	29.2	31.0	1.0	51.2	315.1	232.2	73.6
WC284-20†	168.2	151.8	16.1	4.4	21.8	362.0	319.7	88.4
WC285-18†	275.2	95.0	20.0	0.5	41.2	431.9	370.2	85.7
WC285-83†	123.6	134.4	30.0	0.5	10.8	299.0	258.0	86.0
WC285-85†	202.5	85.2	10.5	0.3	20.5	318.7	287.7	90.2
R. Burbank†	280.1	13.6	19.2	3.3	92.4	408.6	293.4	71.9
WC230-14†	267.0	78.3	17.7	1.5	37.1	401.7	345.3	85.9
BT5215-2	261.9	79.1	14.3	0.5	24.6	380.7	341.5	90.2
UX123-4-2*	272.9	15.4	4.6	1.0	50.7	344.3	288.0	83.7
67-64-6*	216.6	78.8	8.4	3.1	22.0	329.0	295.4	89.5
DT6063-1R*	225.8	75.5	20.2	4.1	20.7	346.1	301.1	87.0
R. McClure*	313.6	46.1	69.9	11.0	33.8	474.4	359.7	76.0
Kennebec	187.9	71.9	47.6	4.9	27.1	339.5	259.8	76.3
BC7257-2	278.5	61.4	34.0	5.4	28.2	407.3	340.0	83.6
BC7163-2	276.7	21.2	17.2	1.8	42.5	359.2	297.7	83.0
Oromonte	290.3	104.2	27.6	4.4	42.8	469.0	394.2	84.1
LSD	42.0	35.9	18.9	6.9	13.9	52.2	49.3	16.8

†Russet Selection

*Red Selection

CONNECTICUT

Arthur Hawkins

Potato Variety and Seedling Test in Connecticut--1972

The 1972 potato variety test was conducted on a commercial potato field in the Connecticut River Valley under good soil conditions and good insect control throughout the season. The fertilizer was applied in sidebands as rows were furrowed out.

Because of the record rainfall of 7 inches in May and 8 to 11 inches in June, an additional 60 lbs of nitrogen per acre was topdressed prior to final hilling. Irrigation was applied one time. Foliage of all longer-season varieties was dead by September 25.

Seed was supplied by the USDA National Potato Breeding Program from Presque Isle, Maine, except Hudson from Cornell.

Plots were single rows, 21 feet, replicated four times. Experimental procedures, total yields, yields over 1-7/8" with seriously off-shaped tubers removed, percent of tubers over 4", specific gravity, and chip color are given in Connecticut Table 1. Soil tests and fertilizer rates are also given in the footnotes.

Yields. Highest yields over 1-7/8" and free of off-shape were produced by B6567-12, Hudson, Abnaki, Cascade and Oramonte; followed by S47156, and Norchip slightly higher than Katahdin; and relatively low yields by Superior, Alamo, Peconic and B6562-14.

Specific Gravity. Highest specific gravity was produced by Oramonte, Hudson, Norchip, B6562-14, Abnaki, S47156, and Cascade; followed by Katahdin, B6567-12, Peconic, Superior, and Alamo lowest.

Chipping Quality. Abnaki and B6562-14 were superior to all varieties, followed by Peconic, Katahdin and Oramonte. Hudson, Norchip and S47156 chipped slightly better than Superior and Cascade. Alamo and B6567-12 chipped dark.

Tuber Observations. Presence of hollow heart, drought spot, stem-end discoloration and vascular discoloration was determined on 20 tubers (5 tubers from each of 4 replicates), size 2½-3" diameter.

Hollow heart: Tubers 2½-3" diameter: Alamo, 1 in 20 (1/20); others none.
Tubers over 4": Abnaki, 6 of 11 (6/11); Katahdin, 1/1; S47156, 2/3; Hudson, 0/3, but a 3½" tuber had hollow heart.

Drought spot: None in 1972. In 1971 present in some varieties notably Oramonte, 7/20; Norchip, 3/20; Hudson, 1/20; Peconic, 1/20.

Stem-end discoloration: All had some less than $1/8$ " depth. Slight ($1/8$ - $1/4$ "):
Abnaki, 10/20; Hudson, Oramonte and Peconic, 9/20; Superior and S47156, 8/20;
B6567-12, 7/20; Norchip, 6/20; Katahdin and Alamo, 3/20; Cascade, 3/20.
Moderate ($1/4$ - $1/2$ "): Oramonte, 6/20; Abnaki, Katahdin, Norchip, Superior, 3/20;
Alamo, 1/20. Severe ($1/2$ " +): Katahdin, 2/20.

Vascular discoloration: Very slight (just detectable): Superior, 9/20;
Alamo, 8/20; Oramonte and B6567-12, 7/20; Norchip, Peconic, 5/20; Katahdin, 3/20;
Cascade, S47156, 2/20; Hudson, 1/20; Abnaki and B6562-14, 0/20.
Slight ($1/3$ of tuber length light discoloration): Alamo, 4/20; Katahdin,
Oramonte, and Peconic, 3/20; Abnaki, 2/20; others, 0/20.
Moderate (darker and $2/3$ tuber length): Oramonte, 1/20.

Connecticut Table 1. Yield^{1/}, specific gravity, and chip color of potato varieties and seedlings - Connecticut, 1972^{2/}

Variety or seedling ^{3/} Spacing 9" except as noted	Total yield per acre	<u>Yield per acre over 1-7/8"</u>				Tubers over 4"	Specific gravity ^{5/}	Chip color 2/15/73
		Free of off-shape ^{4/}						
		Cwt	%	Cwt	%			
Abnaki (8")	433	98	426	98	426	5.1	82	6.3
Alamo	323	90	289	90	289	0.0	68	9.1
Cascade	461	91	420	90	415	0.0	81	8.3
Hudson (8")	487	96	467	95	464	1.4	84	7.4
Katahdin	370	96	354	96	354	0.7	77	6.9
Norchip(10")	416	93	387	89	371	0.0	84	7.4
Oramonte	440	94	413	93	411	0.0	86	7.0
Peconic(10")	297	94	278	93	275	0.0	75	6.8
Superior	318	93	294	92	291	0.0	75	8.1
S47156	392	98	383	96	375	1.8	82	7.8
B6562-14	342	89	304	81	276	0.0	84	6.3
B6567-12	513	97	497	93	478	0.0	76	8.9

- 1/ Plots: 1 row 21 feet; rows 35" apart. Replication: four in randomized blocks (each 4 sections x 4 rows) not damaged by sprayer wheels. Soil: Narragansett silt loam; shade tobacco previous several years; pH 5.5; P = H; K = H; Mg = M. Fertilizer: 2500 lbs 8-10-10-3 per acre sidebands at planting. Following heavy rains May and June additional 60 lbs N per acre topdressed.
- 2/ Season and conditions: So. Windsor, 12 miles N.E. of Hartford. Planted: 5/11/72. Record rainfall 7 inches May, 8 to 10 inches June required topdressing additional 60 lbs N per acre. Control of insects good throughout season. Longer season varieties foliage practically dead by Sept. 25. Abnaki showed high degree of air pollution symptoms; Norchip lesser degree.
- 3/ Seed cut 1½-2 oz.; spaced 9" apart except as indicated.
- 4/ Considerable off-shape in B6562-14, B6567-12 and Norchip.
- 5/ Specific gravity: Average of 4 replicates; tubers 2½-3"; 8 lb samples, weight in air and water method.
- 6/ Harvested: 10/12/72. Storage: Farm storage about 50°F until 11/15/72, then stored at 55°F. Specific gravity run 1/9/73. Storage temperature raised to 70°F on 1/19/73. Chipped on 2/15/73. Chip color: Average of 20 chips, 5 from each of 4 replicates. Chips 6.0 and 7.0 light; 8.0 acceptable; higher reading, darker chip. Sprouts 2/15/73: Alamo, 1¼-1½"; Superior, 1-1¼"; Abnaki, 1"; Norchip, 3/4-1"; Cascade, Peconic & B6562-14, ½-3/4"; Katahdin, Oramonte & B6567-12, ¼-½"; S47156, ¼"; Hudson, 1/8".

DELAWARE

R. F. Stevens, Francis Webb, and Roger Ginder^{1/}

Potato Varieties and Seedling Performance at Dover, Delaware, 1972

Twenty-nine different potato varieties and seedlings were planted on April 11 and April 12, 1972. Fertilizer (10-10-10) was applied in bands at planting at the rate of 1,600 pounds per acre. Row spacing was 36" and the standard in-row spacing 8" to 9".

Six USDA clones were subjected to excess soil moisture due to heavy rainfall, and results on these six clones cannot be considered dependable.

This study was carried out on the farm of John Tarburton, two miles east of Dover on Route 8.

Harvests of all the USDA clones were made on August 10 and August 21, 1972.

Twenty-seven clones and four standard varieties were tested for chip quality. Chips were made from two harvests and again after storage at 70° F.

^{1/} Extension Horticulturist, Kent County Agent and Crops Marketing Specialist.

Delaware Table 1. Performance of 27 Potato Varieties and Clones

Clone	Comparative Maturity ^{1/}	Yield U.S. No. 1 Per Acre cwt.	Specific Gravity	Scab Rating ^{2/}	Comments
B-5282-13	2	260	1.062	2	
B-6712-9	2	257	1.060	4	Growth Cracks
B-6692-19	4	209	---	1	
B-6097-9	1	291	1.069	2	2nd Growth
B-6547-8	1	122	---	2	
B-6516-5	2	252	1.070	2	
B-6516-15	3	283	1.064	2	Appearance Good
B-5287-16	1	176	---	5	Scab Heavy
B-6815-14	4	342	---	4	Red Skins 2nd Growth
B-6516-26	3	297	1.069	2	Appearance Good
Norchip	3	232	1.063	2	
Superior	2	294	1.062	2	
BR-6320-1	1	137	1.063	2	
B-6692-9	2	365	1.061	1	Large Appearance Good
B-6739-2	1	272	1.065	1	Appearance Poor
*B-6743-3	5	201	1.069	3	
*B-6741-3	5	205	---	3	
*B-6712-17	1	178	1.064		
*B-6928-8	4	200	1.062	2	
*B-6969-1	1	190	---	2	
B-6968-3	2	205	---	2	Small
B-6929-10	2	223	---	2	Appearance Good
B-6558-10	2	240	1.062	2	
B-6951-1	4	279	---	1	Small
B-6692-5	2	223	---	2	Appearance Good
B-6598-8	2	242	---	1	
B-6815-1	2	233	---		Appearance Good

*Severely damaged by excess moistures so results are questionable.

^{1/} Comparative maturity 1 = earliest, 5 = latest

^{2/} Scab Rating 1-5. 1 = None, 2 = Very Light, 3 = Light Infection, 4 = Moderate.

Delaware Table 2. Chip Color of Potato Clones^{1/}

<u>Variety</u>	<u>1st Harvest</u>	<u>Storage 2 wks.</u>	<u>2nd Harvest</u>
B-528-13	B	C	C
B-6712-9	B	C	B
B-6692-19	D	D	D
B-6097-9	C	D	C
B-6547-8	B	B	B*
B-6516-5	A	A	A*
B-6516-15	B	B	A*
B-5287-16	C	C	C
B-6815-14	D	D	D
B-5616-26	B	A	B*
Norchip	C	B	B
Superior	B	C	C
BR-6320-1	C	B	C
B-6692-9	A	B	C
B-6739-2	C	C	C
B-6743-3		B	C
B-6741-3		B	D
B-6712-17	B	B	B
B-6928-8		D	A
B-6969-1	A	A	D
B-6968-3	C	C	A
B-6929-10	D	B	B
B-6558-10	B	B	B*
B-6951-1		C	D
B-6692-5	B	C	B
B-6598-8	A	B	C
B-6815-1	C	B	A

*Excellent chip color.

^{1/} Chip Color Rating: A=Excellent, B=Good, C=Fair,
D=Poor or unsatisfactory

FLORIDA

J. R. Shumaker

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for desirable horticultural characteristics at the Agricultural Research Center, Hastings, Florida, in replicated, intermediate and observational trials. Two-ounce seedpieces were planted by hand in late January and early February on Rutledge fine sand following a sorghum cover crop. A total of 2,500 pounds of 6-8-8 fertilizer per acre was banded on each side of the row just prior to planting. A side-dressing of 190 pounds per acre of 15-0-15 was applied approximately four weeks after planting. Seedpieces were spaced 12 inches apart within a row and 40 inches between rows. All plots were a single row 15 feet long. Tubers were harvested and graded May 15-18. Tuber samples were shipped to James Watts, Horticulturist, Wise Foods, Berwick, Pennsylvania, for chip evaluation. Tubers were stored at an average temperature of 70° F and humidity of 50 percent during these evaluations.

Conditions. Unseasonably wet conditions prevailed during the growing season. Over 20 inches of rainfall was recorded during the course of these tests. Severe reduction in quality and severe to moderate reduction in yields were observed and attributed to both the wet conditions and sporadic incidences of corky ring spot disease.

Replicated Trials. Thirteen named varieties, 11 seedling selections and Sebago, the standard variety to northeast Florida, were replicated five times. Florida Table 1 summarizes the results of these trials. LaChipper and Peconic were statistically superior to Sebago in yield response.

Intermediate Trials. Thirty-five seedlings and two varieties were replicated three times. Sebago check plots were planted so that each stock on trial was either flanked or only two rows removed from the check. Eleven of the entries were superior to Sebago yields. Florida Table 2 summarizes these results.

Observational Trials. Golden nematode-resistant, russet, and white clones were replicated two times in observational trials. Florida Table 3 summarizes the results of these trials. Golden nematode-resistant clones were planted in order to observe possible resistance to southern root-knot nematodes. However, nematode infestation of tubers was insufficient to draw a valid conclusion. In this test B6987-56 was the best performing clone followed by B6987-29. None of the russet seedlings were superior to Norgold Russet. In the white clone test, nine of the 52 entries were superior to Sebago yields.

Florida Table 1. Yield, specific gravity, and chip color^{1/} results of 1972 replicated trials at Hastings, Florida

Stock	Yield		Specific Gravity	Chip Color ^{2/} Dates	
	US "A"	Total ^{3/}		5/19	5/31
	cwt/acre				
LaChipper	228	251	1.061	6	5
Peconic	225	240	1.059	3	5
BR6614-1	209	223	1.053	6	9
B6712-18	203	219	1.056	6	7
Red LaSoda	193	217	1.048	7	9
B6987-57	193	208	1.061	2	3
Abnaki	193	210	1.064	6	7
B6955-35	192	217	1.063	2	7
Chieftan	187	205	1.052	6	6
Cascade	183	210	1.053	10	11
NY 41	180	195	1.057	5	8
Pa 70A-12	178	196	1.063	1	5
Sebago	176	205	1.052	4	6
Seminole	175	193	1.065	2	4
Pungo	171	192	1.048	1	6
B5141-6	168	181	1.064	3	6
Penn 71	162	188	1.056	2	4
Pa 71D-8	161	182	1.063	5	4
Wauseon	159	184	1.052	4	4
NC64C2-3	158	188	1.056	3	5
B6987-54	155	175	1.055	2	4
Superior	155	169	1.059	2	5
Norchip	154	183	1.066	2	5
Anoka	117	138	1.059	6	6
Minn 3915	108	133	1.054	9	9
LSD .05	41				

^{1/} Chip color evaluations were determined by James Watts, Horticulturist, Wise Foods, Berwick, Pa.

^{2/} Chip color values are based: 1-4 = acceptable color; 5 = borderline; and 6-14 = color too dark for use.

^{3/} Includes both marketable and culls, size A and B.

Florida Table 2. Yield and specific gravity results of 1972 intermediate seedling trials^{1/} at Hastings, Florida.

Stock	Yield		Specific Gravity
	US "A"	Total ^{2/}	
	cwt/acre		
Pa 71R-1	86	108	1.058
NY-F9-31	110	139	1.062
Pa 7NS-2	87	133	1.061
B6967-8	144	177	1.051
B6969-1	105	135	1.051
B6987-22	107	124	1.060
B6987-37	122	167	1.064
BR6246-1	92	132	1.054
B6987-56	158	198	1.063
B7024-4	90	125	1.058
B7024-6	97	125	1.058
Minn 5522	52	76	1.054
Minn 5562	101	121	1.052
Minn 5849	70	101	1.051
Minn 5891	48	82	1.061
Minn 5907	38	66	1.053
Minn 6051	100	119	1.060
Minn 6081	77	104	1.054
Minn 6082	45	79	1.060
Minn 6086	28	56	1.057
Minn 6088	58	146	1.050
Minn 6091	127	171	1.048
Minn 6096	81	92	1.053
Minn 6101	33	63	1.055
Minn 6102	109	145	1.055
Minn 6130	40	54	1.057
Minn 6179	40	52	1.059
Minn 6209	53	63	1.066
Minn 6214	60	89	1.055
Minn 6243	67	71	1.054
Minn 6256	45	75	1.054
Minn 6319	49	80	1.056
Minn 6361	39	56	1.059
Minn 6376	90	111	1.052
Minn 6700	39	60	1.050
Pungo	85	120	1.056
Wauseon	127	149	1.050
Sebago (Mean of 9 plots)	100	131	1.052

^{1/} Mean of three replications.

^{2/} Includes both marketable and culls, size A and B.

Florida Table 3. Results of 1972 seedling observational trials^{1/} at Hastings, Florida

Stock	Yield		Specific Gravity
	US "A"	Total ^{2/}	
cwt/acre			
<u>Golden Nematode-Resistant Clones</u>			
B6731-3	36	103	1.053
B6986-2	97	136	1.057
B6987-18	117	153	1.058
B6987-22	49	71	1.067
B6987-29	177	226	1.062
B6987-43	73	124	1.067
B6987-56	213	262	1.072
B7152-8	103	138	1.065
B7154-10	162	217	1.049
B7154-57	111	161	1.057
Wauseon	103	142	1.060
Peconic	145	184	1.051
Sebago (Mean of 16 plots)	127	171	1.053
<u>Russet Clones</u>			
Norgold Russet	151	195	1.053
B7147-6	101	146	1.049
B7147-15	88	134	1.057
B7147-22	85	148	1.046
B7147-90	98	177	1.053
B7147-94	116	177	1.058
B7159-26	106	146	1.052
B7160-4	110	217	1.046
B7196-23	123	176	1.044
B7196-36	72	151	1.039
B7196-104	134	196	1.047
<u>White Clones</u>			
B5282-13	127	206	-
B5287-16	68	179	-
B5647-8	122	170	-
B6097-9	31	140	-
BR6320-1	135	212	-
B6516-5	39	132	-
B6516-15	166	211	-

Stock	Yield		Specific Gravity
	US "A"	Total ^{2/}	
	cwt/acre		
B6516-113	70	142	-
B6558-16	29	131	-
B6595-12	77	123	-
B6692-5	8	183	-
B6692-9	41	132	-
B6712-9	97	246	-
B6712-17	40	179	-
B6739-2	93	220	-
B6761-11	133	199	-
B6761-12	69	143	-
B6774-6	84	211	-
B6815-19	126	264	-
B6959-10	183	252	-
B6951-1	169	250	-
B6968-3	110	226	-
B6969-1	150	184	-
B7132-1	122	257	-
B7132-14	121	257	-
B7132-22	91	189	-
B7132-25	80	224	-
B7132-26	83	219	-
B7132-27	122	217	-
B7132-29	84	196	-
B7134-3	112	224	-
B7136-5	125	234	-
B7138-11	96	195	-
B7139-4	206	301	-
B7139-12	66	135	-
B7139-15	56	138	-
B7145-1	84	161	-
B7145-3	178	244	-
B7152-40	107	181	-
B7154-10	75	197	-
B7155-6	116	196	-
B7165-10	81	180	-
B7167-2	62	169	-
B7167-14	72	161	-
B7169-7	48	173	-
B7196-61	106	196	-
B7198-6	170	220	-
B7200-2	156	220	-
B7200-26	145	220	-
B7212-2	122	174	-
B7236-1	90	167	-
B7243-7	118	218	-
Sebago (Mean of 8 plots)	140	238	-

^{1/} Mean of two replications

^{2/} Includes both marketable and culls, size A and B.

FLORIDA

D. P. Weingartner and J. R. Shumaker

Corky Ringspot Resistance

Seven cultivars and 10 selections were evaluated for resistance to corky ringspot disease (CRS). The disease is caused by Tobacco Rattle Virus (TRV) and is transmitted in the Hastings, Florida area by Trichodorus christiei. All selections and cultivars except X9656 were evaluated in two separate replicated tests performed in a grower's field in which CRS had occurred each year for more than 15 years. Pungo and Sebago were included in the test as standard CRS resistant and susceptible cultivars, respectively. A randomized block with four replications was used in both tests. Cultural practices recommended for the area were followed throughout the test period.

Potatoes were cut by hand and planted January 26, 1972. Plots were harvested May 26, 1972. Random samples of fifteen US "A" size tubers were taken from each plot for CRS indexing. Presence of CRS lesions on tuber surfaces was scored on a presence-absence basis. Internal necrosis was observed by cutting individual tubers with a commercial french fry cutter and scoring on a presence-absence basis. The 1972 season was unusually wet (20+ inches during the test period) and CRS was generally severe in the area.

Florida Table 1. Incidence of Corky Ringspot (CRS) in 17 potato varieties and selections. Agricultural Research Center, Hastings, Florida--1972

Selection ^{1/} or Variety	Percent Tubers With CRS Symptoms					
	(Test 1)		(Test 2)		Mean Value Both Tests	
	Internal	External	Internal	External	Internal	External
Pungo	0	0	0	0	0	0
Green Mountain	0	0	0	0	0	0
Merrimack	0	0	0	0	0	0
B7158-32	0	0	0	0	0	0
B7152-1	0	0	0	0	0	0
Plymouth	1.0	1.0	0	0	0.5	0.5
Mohawk	1.9	0.0	0.0	3.1	1.0	1.6
X9656	-	-	4.3	0.0	4.3	0.0
Katahdin	5.7	5.7	0.0	3.1	2.9	4.4
B7152-22	4.5	0.0	16.7	4.2	10.6	2.1
B7158-34	16.7	3.5	0.0	1.6	8.4	2.6
B7152-30	4.2	0.0	31.3	3.1	17.8	1.6
B7152-5	14.7	18.6	18.8	0.0	16.8	9.3
B7152-40	18.0	21.8	18.2	10.2	18.3	20.1
B7158-10	13.8	16.3	23.7	10.8	18.8	13.6
Sebago	26.0	24.1	8.3	8.3	17.2	16.2
B7158-35	22.2	35.1	47.8	21.6	35.0	28.4

^{1/} All differences among selections and varieties significant at 5% level of probability.

Florida Table 2. Yield and specific gravities of 17 potato cultivars and selections evaluated for corky ringspot (CRS) resistance.
Agricultural Research Center, Hastings, Florida--1972

Cultivar ^{1/} or Selection	Specific Gravity			Yield US "A" Size Tubers cwt/acre		
	<u>Test 1</u>	<u>Test 2</u>	<u>Mean</u>	<u>Test 1</u>	<u>Test 2</u>	<u>Mean</u>
Pungo	1.063	1.065	1.064	187.3	152.5	169.9
Green Mountain	1.071	1.070	1.071	136.2	123.1	129.7
Merrimack	1.066	1.062	1.064	188.4	155.8	172.1
B7158-32	1.064	1.059	1.062	54.5	44.7	49.6
B7152-1	1.064	1.065	1.065	168.8	124.2	140.5
Plymouth	1.062	1.063	1.063	143.8	163.4	153.6
Mohawk	1.065	1.069	1.067	147.0	127.4	137.2
X9656	-	1.069	1.069	-	103.5	103.5
Katahdin	1.067	1.064	1.066	103.5	107.8	105.7
B7152-22	1.060	1.063	1.062	175.4	129.6	152.5
B7158-34	1.070	1.068	1.069	75.2	45.7	60.5
B7152-30	1.068	1.064	1.066	128.5	83.9	106.2
B7152-5	1.063	1.066	1.065	140.5	120.9	130.7
B7152-40	1.064	1.065	1.065	75.2	94.8	85.0
B7158-10	1.072	1.077	1.075	61.0	55.5	58.3
Sebago	1.059	1.067	1.063	101.3	118.7	110.0
B7158-35	1.063	1.065	1.064	65.4	85.0	75.2

^{1/} All differences among selections and varieties significant at 5% level of probability.

PACIFIC NORTHWEST

J. J. Pavak and D. R. Douglas

Breeding

Greenhouse. Sixty-seven superior tetraploid clones were crossed in 719 combinations averaging 2400 seeds per cross. Almost all crosses include long tubers, russet skin, medium to high solids, medium to low sugars, mealy cooked texture, and resistance to scab and Verticillium wilt. Many crosses also have resistance to corky ringspot, early blight, and PVX.

Two hundred sixteen families of seedlings were grown producing 24,000 tubers.

Field. Approximately 40,000 single hills of 329 families were grown in scab and Verticillium infested fields; 1466 were selected.

From 886 12-hill plots, 248 were selected, french fried, and specific gravities determined. This number will be reduced by about 50% by planting time, May 1973.

One hundred thirty-four species selections and 44 tuber families were screened for desirable characteristics. A number of andigena, phureja, and stenotomum selections were identified as tuberizing satisfactorily and being high in solids and low in sugars.

Yield Trials. Six yield trials were conducted with 223 clones at Aberdeen, Idaho. These included preliminary, intermediate, and advanced clones--early and regular harvest. In addition, the Advanced Early Harvest Trial was grown at the Malheur Experiment Station, Ontario, Oregon, by Luther Fitch. He also grew some of the other clones in observational trials.

The Aberdeen trials were planted May 9-12 at a 10-inch spacing in 36-inch rows in a field of Declo silt loam; a RCB design was used. One hundred seventy pounds of nitrogen, 90 pounds phosphate, and three pounds Temik were applied per acre in bands at planting. Irrigation water was applied nine times between June 14 through September 14 in furrows. Eptam and Lorax were applied to control weeds, Thiodan and Mata-systox-R were applied at two-week intervals after mid-July to control aphids, and dinitro was used to kill vines prior to harvest.

The weather during the growing season averaged 1.2 degrees below normal at Aberdeen, with July 3.8 degrees below. The first killing frost occurred on September 29.

The yields obtained in the Advanced Yield Trial (P.N.W. Table 1) were considerably lower than those obtained in 1970 and 1971. This probably is due partly to insufficient moisture at planting, delayed first irrigation, and over irrigation for the remainder of the season. Russet Burbank and several selections were particularly low yielding. The percentage of U.S. No. 1's and the specific gravities were good. The top yielding clone, A6789-7, has very attractive, smooth tubers, and even though its specific gravity equals that of Russet Burbank, its cooked texture was poor, i.e., non-mealy.

The results of the Advanced Early Harvest Trial are presented in P.N.W. Table 2. The yields at Ontario were much higher than at Aberdeen. Aberdeen's top yield of 227 cwt/A compares with 371 cwt/A in 1971. Apparently, getting fast, vigorous growth early in the season is very important in obtaining top yields.

Results in the intermediate and preliminary trials were similar to those of the two advanced trials.

Distribution. A summary of distribution of selections, varieties, seedling tubers, and true seeds is presented in P.N.W. Table 3.

P.N.W. Table 1. Advanced Yield Trial, Aberdeen, Idaho. (Four replications of 20 hills)^{1/}

Clone	Percent of Total Yield				September 12 ^{3/}			French ^{4/}		Tuber ^{5/}	
	US No. 1		US No. 2		Specific ^{2/}	Dead	Stems	Plant	Fry	Color	Shape
	Total	Over 10 oz	6-10 oz	Proc.							
Owt/A	Yield	97	62	27	3	3.5	4	2.2	4	4.5	0-L
A6789-7	351	97	62	27	3	3.5	4	2.2	4	4.5	0-L
A66107-107	345	90	48	33	10	3.9	0	2.8	3	3.5	0
A66107-44	319	88	31	34	12	3.2	15	3.4	3	3.3	0-L
A67490-2	316	92	42	31	8	3.1	4	3.0	1	4.5	0-L
A66107-51	312	93	63	24	7	3.5	0	2.7	2	4.2	0-L
A66110-39	300	89	47	30	11	3.4	4	2.0	1	3.5	0
A6536-5	275	90	44	35	10	3.6	7	2.9	2	3.2	0-L
A66102-13	274	84	21	40	16	5.2	10	2.7	3	2.3	0
A66102-5	264	82	22	39	18	3.2	48	3.0	5	3.3	0-L
A67315-7	252	90	38	35	10	4.0	1	1.3	3	4.0	0
A66122-3	249	84	37	29	16	3.6	7	2.0	1	2.5	L-0
A67315-6	247	91	42	34	9	4.1	0	1.4	2	3.8	0
A66122-4	245	86	25	34	14	3.2	33	3.0	2	2.2	0-L
A66119-7	243	81	13	36	19	3.4	7	2.5	1	3.7	L
A66110-25	237	90	50	31	10	3.3	10	2.7	3	3.7	0
A6371-2	227	83	20	36	17	2.6	89	3.4	3	3.8	L
A6621-13	225	79	21	39	20	3.2	17	2.3	5	4.7	0
A66133-7	223	77	34	32	21	3.7	2	2.3	1	3.7	0
A5400-15	221	81	20	30	19	2.6	83	3.0	2	3.8	0-L
A63197-1	221	80	26	37	20	3.1	48	2.7	1	3.0	L-0
A6698-4	216	92	43	34	7	3.0	9	1.8	1	4.2	0
A66110-23	212	82	16	36	18	3.2	60	2.8	1	4.2	0
A66107-207	208	85	16	42	15	3.0	70	3.5	2	3.3	0
Russet Burbank	198	73	14	32	26	2.9	80	3.2	2	3.8	L
A66133-8	184	85	25	40	15	3.4	7	1.5	1	2.7	0
A6354-39	167	85	15	44	15	3.1	17	2.0	2	3.3	0
A64206-4	162	67	5	29	32	3.1	57	2.9	1	4.0	L-0
A6382-10	150	76	9	40	21	3.1	32	2.3	1	4.3	0
LSD	.05	47									

.003

^{1/} Planted May 12, harvested October 9.

^{2/} 1.0 omitted.

^{3/} Mat. = maturity: 1.0 (earliest) to 5.0 (latest); plant size: 1.0 (smallest) to 4.0 (largest).

^{4/} 1.0 (lightest) to 5.0 (darkest); in storage for two months - down to 40°F.

^{5/} 0 = oblong, L = long, 0-L = oblong-long, etc. M = medium, Lt = light, V = very, Hv = heavy. 6/ 1 (least) to 5 (most).

P.N.W. Table 2. Advanced Early Harvest Trial, Ontario, Oregon and Aberdeen, Idaho, 1972.

Clone	Ontario ^{1/}						Aberdeen ^{2/}						French ^{4/}			Tuber ^{5/}	
	Total			Percent of Total Yield			Total			Percent of Total Yield			Fry			Shape	
	Tuber			US			Yield			US			Ont.			Russet-	
	Cwt/A	Total	Yield	Over	No. 2	Proc.	Cwt/A	Total	Yield	Over	No. 2	Proc.	Ont.	Abd.	Color	Abd.	ing
Pioneer	416	79	29	12	26	12	211	78	10	20	87	85	0.5	0.7	0-L	(red)	
A6305-20	414	62	21	26	9	26	180	74	17	25	77	74	1.1	2.0	0	M	
Cascade	402	84	27	9	8	9	162	61	10	37	82	81	0.9	0.6	0	(white)	
Hi-Plains	396	82	29	8	33	33	184	68	2	31	83	83	0.5	0.5	0, flat	(white)	
A67284-5	391	56	22	15	11	11	180	86	16	14	86	81	0.8	0.9	L-0	lt	
A6673-4	382	68	13	15	14	14	200	76	7	24	75	71	---	0.6	0-R	M	
A66110-7	381	74	19	11	14	14	171	69	5	30	84	82	0.5	0.8	0-L	M-	
Norgold Russet	380	71	24	14	21	21	130	47	1	50	83	78	2.2	1.7	0	M-	
A63126-2	370	60	8	48	5	5	---	---	---	---	91	---	---	---	L	M	
BR6316-5	361	92	35	19	23	23	---	---	---	---	90	---	---	---	0-R	(white)	
Rushmore	359	72	7	7	9	9	174	84	15	15	84	80	0.5	0.7	0-L	V. lt	
Russet Burbank	357	58	7	23	9	9	165	55	3	39	84	82	0.9	1.2	L	M	
A6673-1	354	70	9	22	12	12	212	67	8	31	78	78	0.5	0.6	0	lt	
NDA7697-2	335	65	19	22	15	15	227	84	22	15	78	77	0.5	0.5	0	V. lt	
NDA7746-1	335	72	16	12	15	15	129	61	2	38	86	87	0.9	0.5	0	M. Hv	
NDA7698-1	335	65	16	20	17	17	173	69	7	28	79	77	1.0	0.9	0-L	lt	
A6382-10	333	64	9	20	14	14	137	55	3	43	90	90	0.6	0.6	0-L	M	
A6680-5	330	65	27	15	17	17	141	72	3	27	84	82	1.0	0.5	L-0	M	
A66107-101	326	55	8	14	6	6	142	42	4	54	84	82	0.6	0.6	0-L	M. Hv	
A6698-4	325	39	4	17	28	28	166	68	8	25	83	81	1.0	1.2	0-L	M	
A6334-19	321	78	9	6	6	6	---	---	---	---	84	---	---	---	0	M. Hv	
NDA7932-1	304	39	19	28	6	6	154	68	7	20	82	82	2.7	0.5	0-L	lt	
A66107-197	304	75	21	6	6	6	143	71	7	29	84	84	0.5	0.8	0	lt	

LSD .05

35

.010

1/ Planted April 20, vines removed July 28, harvested August 2. Ontario, Oregon data obtained from Luther Fitch.

2/ Planted May 9, vines killed August 9, harvested August 21.

3/ 1.0 omitted.

4/ French fried two or three weeks after harvest.

5/ See footnotes P.N.W. Table 1.

P.N.W. Table 3. Distribution of Selections, Varieties, Seedlings, or Seeds, 1972.

Location	Cooperator	Number
<u>Selections/Varieties</u>		
Arizona	P. Bessey	247
California	H. Timm	7
Colorado	D. Denna	9
	K. Knutson	1
Costa Rica	J. Iverson	20
Idaho	E. Anderson	9
	A. Boe	6
	R. Callihan	2
	W. Dazey	5
	R. DeRouche	1
	W. Floyd	1
	J. Garner	2
	M. Groskopp	24
	G. Holm	1
	H. McKay	2
	R. Ohms	2
	E. Owens	3
	D. Robertson	1
	G. Vogt	2
	A. Walz	2
	D. West	1
Maine	J. Frank	5
Missouri	B. Tweedy	1
Oregon	L. Fitch	64
	J. B. Holladay	9
Washington	W. Hoyman	30
	R. Kunkel	5
Wisconsin	P. R. Rowe	1
	J. Schoeneman	8
<u>Seedlings</u>		<u>(Families)</u>
Alberta	S. Molnar	162
North Dakota	R. Johansen	33
<u>Seeds</u>		<u>(Crosses)</u>
Alberta	S. Molnar	40
Colorado	D. Denna	50

MAINE

D. C. Merriam and F. E. Manzer

Ring Rot Resistance

The results of these annual tests are reported one year behind in order that tubers of selections appearing disease-free or questionable in the field can be checked after a storage period of five or six months. As in recent years these tests are conducted only on selections shown in previous plantings to have commercial promise. Entries are replicated four times (unless otherwise noted) in five-hill lots, and inoculation is accomplished by dipping freshly cut seedpieces in a slurry made by grinding the vascular tissue of diseased tubers. Katahdin is used as the susceptible check unless otherwise stated.

Only two five-hill replications were planted in 1971. Of the 41 selections inoculated, none were completely free of disease symptoms in the field and 12 were saved for examination after a storage period. Plant and tuber readings of these 12 are shown in Maine Table 1. Katahdin checks were nearly 100 percent diseased in field readings.

Maine Table 1. Advanced selections showing low disease incidence in ring rot inoculation tests--1971.

Amount of disease by replication^{1/}

Pedigree Number	Plants		Tubers		Pedigree Number	Plants		Tubers	
	1	11	1	11		1	11	1	11
B6928-8	1/5	5/5	1/17	-	BR7058-2	1/3	4/5	1/15	-
B6934-7	4/4	1/5	-	2/18	BR7068-5	4/5	?/5	-	4/16
B6934-9	1/5	5/5	0/21	-	BC6785-1	5/5	1/2	-	3/10
B6028-W.V.6	1/5	5/5	3/12	-	WC284-20	1/5	2/4	4/18	-
B6966-1	4/5	1/5?	-	1/19	BC7021-1	2/5?	4/4	0/13	-
B7001-18	1/5?	4/5	0/34	-	WC285-146	1/5	3/4	0/16	-

^{1/} Numerator = number diseased
Denominator = number examined

MAINE

D. C. Merriam and F. E. Manzer

Spindle Tuber Resistance

Annual progress summaries of this work are delayed one year because of the necessity for replanting inoculated seedlings to obtain disease readings. As in recent years only selections showing commercial promise in previous plantings are included. Entries are inoculated by the top-switching method in four two-hill lots, and a tuber from each hill is harvested for the disease reading.

In 1971 all of the selections tested were obtained from Dr. R. V. Akeley of the Maine Agricultural Experiment Station. Of the 20 entries inoculated 19 were "BR" numbers and one a "B" number. All Kennebec checks were found to be completely infected in all replications (8/8), and none of the selections were found to be completely free of the disease. Those showing 50 percent infection or less were as follows: BR6820-24, 2/8; BR6820-26, 4/8; BR6824-1, (3/8); BR6831-5, 4/8; and BR6863-9, 4/8.

MAINE

Hugh J. Murphy and Michael J. Goven

Cooperative variety trials with 31 entries were conducted during 1972 at Presque Isle, Grande Isle, and Garland, Maine. Weather and soil conditions at planting time were cold and relatively dry, but the remainder of the growing season was almost ideal for maximum growth and yield.

Plots at all test locations were single rows, 25 feet long with six replicates per variety. Planting, killing and harvest dates, seedpiece spacing, and fertilizer used at each location are presented in Maine Table 5.

Yields and specific gravities for the varieties grown at all Maine locations are presented in Maine Table 1. The top five varieties in yielding ability were: BR6312-2, Cascade, BR6626-5, BR6820-26, and Kennebec. Line BR6491-1, Cariboo, Seminole, BR6862-2, and BR6863-2 were the five highest varieties in specific gravity. Of the 31 varieties in trial, 22 had specific gravities of 1.075 or higher, and only four varieties were below 1.070, which indicates that 1972 was a high, dry-matter year even though total moisture during the growing season was much higher than normal.

Size determinations for two market size classes are presented in Maine Table 2. Several varieties grown at all locations produced high percentages of tubers in the smaller size classes, namely Cariboo, B6097-9, and ND7196-18. Medium and late maturing varieties grown at Garland produced high percentages below $2\frac{1}{4}$ inches because of the error of the cooperator killing the vines too early.

Results of the first chipping and french fry tests are presented in Maine Tables 3 and 4, respectively. Only Seminole at Presque Isle; Seminole and BR6863-3 at Grande Isle; and Cariboo, Seminole, BR6491-1, and BR6863-3 at Garland were the only varieties that had satisfactory chip color (7.0 or less). All except eight of the varieties grown at Presque Isle made satisfactory french fry color (3.0 or less). Seven of the varieties were unsatisfactory in texture (rating higher than 1.2).

Many more details of the Maine Cooperative Variety Trials are presented in the Annual Maine, New Hampshire, Vermont Potato Variety Trial Report for 1972, which is available from Public Information and Central Services, University of Maine, Orono, Maine 04473.

Maine Table 1. Yield and specific gravity of potato varieties grown at three locations in Maine-- 1972.

Variety	Presque Isle		Grand Isle		Garland	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
Cariboo	369	1.094	378	1.090	235	1.083
Cascade	500	1.077	484	1.067	361	1.068
Cobbler	399	1.083	453	1.079	258	1.074
Desiree	339	1.086	308	1.075	152	1.074
Iopride	425	1.079	390	1.067	277	1.074
Katahdin	409	1.085	379	1.073	243	1.069
Kennebec	446	1.087	436	1.075	302	1.072
Oromonte	463	1.092	410	1.078	266	1.073
Russet Burbank	388	1.091	311	1.082	213	1.075
Seminole	322	1.089	411	1.083	184	1.090
Shurchip	448	1.081	372	1.065	261	1.067
Sioux	450	1.083	400	1.072	252	1.071
B6044-14	443	1.088	436	1.080	225	1.077
B6097-9	444	1.085	424	1.072	301	1.078
B6356-1	431	1.063	304	1.052	237	1.056
B6376-6	396	1.084		1.080	255	1.075
BR5957-7	414	1.081		1.075	183	1.068
BR6263-2	411	1.079	331	1.068	265	1.072
BR6306-22	467	1.069	409	1.066	281	1.067
BR6312-2	592	1.071	613	1.060	315	1.060
BR6316-5	416	1.086	407	1.079	260	1.075
BR6456-1	481	1.075	381	1.074	323	1.070
BR6463-2	386	1.086	414	1.078	234	1.079
BR6491-1	342	1.093	352	1.091	216	1.091
BR6626-5	507	1.084	477	1.073	324	1.074
BR6820-26	450	1.073	509	1.063	294	1.066
BR6859-3	336	1.084	311	1.075	193	1.080
BR6862-2	433	1.093	380	1.083	247	1.080
BR6863-3	409	1.092	343	1.083	223	1.081
F5748	399	1.085	421	1.072	263	1.075
ND7196-18	410	1.085	298	1.073	269	1.076

Maine Table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at three locations in Maine-- 1972.

Variety	Presque Isle		Grand Isle		Garland	
	1-7/8	2-1/4	1-7/8	2-1/4	1-7/8	2-1/4
	to 4 inches	to 4 inches	to 4 inches	to 4 inches	to 4 inches	to 4 inches
Cariboo	92.3	67.2	93.1	68.9	93.6	63.8
Cascade	94.3	78.0	97.2	82.8	95.6	78.5
Cobbler	93.5	71.4	95.9	81.8	93.6	71.8
Desiree	95.3	78.4	96.3	85.2	93.7	71.0
Iopride	97.4	79.7	98.5	88.5	97.5	88.3
Katahdin	95.7	82.5	97.0	87.7	94.8	80.3
Kennebec	94.8	85.1	95.1	88.1	95.5	85.2
Oromonte	92.5	76.2	95.7	79.4	88.8	69.7
Russet Burbank	55.9% 4 - 10 oz.		65.0% 4 - 10 oz.		64.9% 4 - 10 oz.	
Seminole	96.5	87.1	98.1	92.3	96.7	86.8
Shurchip	95.4	78.5	95.2	76.9	95.2	72.9
Sioux	97.4	83.6	93.5	87.4	95.0	79.7
B6044-14	94.8	79.0	96.7	81.7	89.4	65.5
B6097-9	90.2	65.5	92.1	64.1	92.2	69.9
B6356-1	87.5	81.6	97.0	91.6	93.9	81.5
B6376-6	95.6	83.4			95.6	87.7
BR5957-7	94.9	84.2			93.8	70.7
BR6263-2	94.7	73.4	94.6	72.0	94.7	76.3
BR6306-22	94.9	76.1	96.1	77.8	96.2	79.7
BR6312-2	94.6	86.3	96.6	91.0	95.3	81.7
BR6316-5	94.1	74.6	96.4	80.2	94.1	73.3
BR6456-1	95.3	74.2	96.3	81.5	95.9	78.9
BR6463-2	92.2	74.1	95.5	81.3	93.2	70.8
BR6491-1	93.8	71.8	96.8	86.5	95.7	76.7
BR6626-5	94.5	80.1	96.3	84.9	96.2	84.5
BR6820-26	94.4	80.3	96.4	84.2	93.4	73.5
BR6859-3	93.2	72.1	96.0	78.4	92.8	62.7
BR6862-2	97.5	87.0	97.3	85.2	97.1	79.7
BR6863-3	96.5	87.3	98.5	92.0	96.7	86.6
F5748	94.4	78.8	94.9	76.9	96.0	73.5
ND7196-18	90.3	51.9	93.1	64.3	89.4	57.0

Maine Table 3. Chip color indices for potato varieties grown at three locations in Maine -- 1972^{1/}

Variety	Presque Isle	Grand Isle	Garland
Cariboo	7.4	8.2	6.7
Cascade	10.0	9.7	9.9
Cobbler	9.8	9.4	9.6
Desiree	7.5	8.0	7.5
Iopride	8.0	9.0	8.1
Katahdin	8.8	9.1	9.3
Kennebec	8.5	9.4	8.2
Oromonte	8.7	9.6	8.7
Russet Burbank	8.8	9.0	8.4
Seminole	6.8	6.8	4.8
Shurchip	8.8	8.4	8.7
Sioux	9.9	10.0	10.0
B6044-14	9.4	9.6	8.0
B6097-9	8.1	9.0	8.8
B6356-1	10.0	10.0	10.0
B6376-6	8.2	8.7	8.0
BR5957-7	7.9	8.4	7.9
BR6263-2	8.8	9.2	8.7
BR6306-22	8.6	8.6	8.4
BR6312-2	10.0	10.0	10.0
BR6316-5	8.2	7.6	6.6
BR6456-1	9.9	9.6	9.6
BR6463-2	9.4	8.7	7.4
BR6491-1	7.3	7.9	6.1
BR6626-5	9.5	9.5	9.1
BR6820-26	9.9	10.0	9.8
BR6859-3	9.7	9.1	9.0
BR6862-2	8.9	8.0	7.2
BR6863-3	7.3	6.6	6.0
F5748	9.3	8.8	8.4
ND7196-18	7.2	8.0	7.3

^{1/}Chips with lower indices are lighter in color.

Maine Table 4. French fry color and texture indices for potato varieties grown at Presque Isle, Maine --1972.

Variety	Color Index ^{1/}	Texture Index ^{2/}
Cariboo	1.6	1.0
Cascade	4.1	1.2
Cobbler	2.9	1.0
Desiree	1.5	1.7
Iopride	2.0	1.2
Katahdin	2.7	1.0
Kennebec	2.2	1.0
Oromonte	2.3	1.1
Russet Burbank	2.6	1.0
Seminole	1.1	1.0
Shurchip	1.4	1.0
Sioux	3.2	1.4
B6044-14	2.5	1.0
B6097-9	1.9	1.1
B6356-1	4.3	1.9
B6376-6	1.8	1.0
BR5957-7	1.9	1.1
BR6263-2	1.9	1.8
BR6306-22	1.9	1.0
BR6312-2	4.8	2.0
BR6316-5	1.5	1.3
BR6456-1	3.7	1.0
BR6463-2	1.7	1.0
BR6491-1	1.3	1.0
BR6626-5	3.4	1.4
BR6820-26	3.1	1.0
BR6859-3	3.6	1.0
BR6862-2	1.2	1.0
BR6863-3	1.1	1.0
F5748	1.9	1.0
ND7196-18	1.1	1.2

^{1/}French fries with lower index numbers are lighter in color.

^{2/}Lower texture indices indicate mealier texture.

Maine Table 5. Pertinent information about Maine Cooperative Potato Variety Trials -- 1972.

	Presque Isle	Grand Isle	Garland
<hr/>			
<u>Planted</u>			
	May 20	May 25	June 6
<u>Killed</u>			
Early varieties	Aug. 28	Sept. 2	Aug. 25
Medium varieties	Sept. 7	Sept. 12	Aug. 25
Late varieties	Sept. 17	Sept. 22	Aug. 25
<u>Harvested</u>			
Early varieties	Sept. 7	Sept. 12	Sept. 14
Medium varieties	Sept. 17	Sept. 22	Sept. 14
Late varieties	Sept. 27	Oct. 2	Sept. 14
<u>Fertilization</u>			
Pounds per Acre	130-130-130	138-172-172	130-130-130
<u>Seedpiece Spacing</u>			
	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

¹/₂ Seedpieces of Desiree and Russet Burbank spaced 16 inches apart;
all other varieties 8 inches.

MICHIGAN

N. R. Thompson and R. W. Chase

All experiments, with the exception of over-state trials, were located on the Montcalm Experiment Station where the soil is a Montcalm sandy loam. Average maximum temperatures for 1972 were below the five-year average in June, July, August, and September but were considerably higher in May. Rainfall was adequate and uniformly distributed throughout the growing season. Irrigation applications were reduced to five applications of approximately one inch each, and these were all applied in July.

Fertilizer Plowdown - 0-0-60 at 200 lbs/A
Planting time - 14-14-14 + 2 percent Mg at 800 lbs/A
Sidedress - 115 lbs nitrogen per acre

Seed Production

Two hundred and forty crosses were made in February and March. Parents with potential for yield, processing quality, and nutritional value were used. Some resistance to the most prevalent diseases was prevalent in the parental clones.

Two-Hill Clones

The large number of selections made in 1971 was planted in either five- or two-hill plots depending upon their initial evaluation as varieties. The average weight per hill, specific gravity, and chip color by families retained in 1972 are shown in Michigan Table 1.

Seedling Increase and Yield Trials

Twenty-four advanced seedling clones were planted in replicated yield trials for yield and quality evaluation. A cooler than average growing season with adequate moisture provided a good environment for growth. Samples were held at 55° F until chipped in November and December. Data on those yielding in excess of 400 cwt per acre are shown in Michigan Table 2.

Plant Spacing Studies--New Varieties

Two seedlings and three recently named varieties were evaluated in a uniform spacing trial. The identification numbers and names were MS-709, MS-711-3, Abnaki, Jewel, and Shurchip.

Planted: May 11, 1972--Harvested: September 19, 1972

Cut seed of each was hand planted at row spacings of 3-4 inches and plant spacings within the row of 7, 10, 13, and 16 inches. Each plot was 10 feet long and replicated four times.

Michigan Table 3 gives a summary of yield, size distribution, and specific gravity response for each of the varieties. All were very favorable in terms of yields with MS-709, Abnaki, and Jewel showing exceptionally good yield potential. Without exception, the greatest total yield occurred at the 7-inch spacing, with decreasing yields at increasingly wider spacings.

The size distribution data shows that MS-709 and Abnaki have a tendency to develop oversize tubers, and for this reason a closer spacing of 7-8 inches would be important. To date there has been no evidence of hollow heart as a problem with MS-709, however, there has been some reported with Abnaki. Based on these observations, it appears that MS-709 and Abnaki should be spaced at a 7-8 inch plant spacing.

The 1972 data differed from that of 1971 in that the specific gravity readings did not relate to plant spacings. In 1971 the specific gravity readings for each of the seedlings MS-709, MS-603, and MS-711-3 were the lowest at the 16-inch spacing. In 1972, this occurred with Jewell variety only.

The increased plant vigor and initial growth of the closer plant spacings are quite apparent during the early stages of growth. Later in the season, when the rows are filled and vines begin to drop, this difference is less obvious.

Over State Yield Trials

In four areas, representing the largest centers of production in the state, 16 varieties were tested for adaptation to the Michigan environment, Michigan Table 4. Of the white varieties tested MS-709, Jewel, and Abnaki were outstanding. The variety Sioux was an exceptionally high yielding red. Chip color and specific gravities of the early varieties were as anticipated, but the wet August and September adversely affected those maturing later.

Line MS-709 was grown in commercial acreages on seven farms for market quality. Seed is being increased.

Michigan Table 1. Average yield and quality of seedling population at Montcalm Experimental Farm.

1972			
<u>Cross No.</u>	<u>Yield Lbs/Hill</u>	<u>Average Specific Gravity</u>	<u>Average Chip Color</u>
001	3.5	1.078	4.4
002	3.5	1.079	3.9
003	3.7	1.083	3.0
004	3.0	1.078	5.0
005	3.4	1.068	5.8
006	3.8	1.065	6.6
007	4.1	1.065	5.5
008	4.7	1.066	7.0
009	4.8	1.066	7.0
010	5.3	1.071	5.0
Average	3.98	1.072	5.3

Michigan Table 2. Seedling yield trials, specific gravity, and chip color. Montcalm Experimental Farm.

1972			
<u>Cultivar</u>	<u>Total Yield Cwt/Acre</u>	<u>Specific^{1/} Gravity</u>	<u>Chip Color</u>
503-14	690	1.064	5
711-8	639	1.064	7
709	523	1.072	8
321-55	519	1.095	3
645-1	504	1.084	7
706-1	488	1.071	3
613-7	480	1.069	4
321-89	472	1.115	3
637	464	1.082	9
623	461	1.069	5
706-34	437	1.068	7
Mer. 249	436	1.083	5
735-1	434	1.080	8
Mer. 58	425	1.067	7

^{1/} Specific gravity weight in air-weight in water method.

Michigan Table 3. The yield, size distribution, and specific gravity of MS-709, MS-711-3, Abnaki, Jewel, and Shurchip when grown at different plant spacings.

Variety	In-row space	Total cwt/A	Percent size distribution			Specific Gravity
			-1-7/8	+3-1/4	1-7/8 - 3-1/4	
MS-709	7	582	2.3	40.0	57.7	1.067
	10	566	2.0	43.9	54.1	1.068
	13	498	2.4	47.8	49.8	1.065
	16	490	2.0	56.6	41.4	1.068
MS-711-3	7	426	7.8	6.4	85.8	1.074
	10	396	7.4	8.4	84.2	1.075
	13	395	5.0	7.9	87.1	1.078
	16	318	6.1	17.2	76.7	1.076
Abnaki	7	512	3.8	16.4	79.8	1.067
	10	440	3.1	24.0	72.9	1.067
	13	426	1.8	34.4	63.8	1.068
	16	396	2.5	35.5	62.0	1.067
Jewel	7	576	6.8	7.8	85.4	1.085
	10	544	4.7	4.7	90.6	1.083
	13	490	3.6	14.7	81.7	1.084
	16	446	4.8	16.7	78.5	1.081
Shurchip	7	480	6.5	5.7	87.8	1.061
	10	454	3.9	3.0	93.1	1.061
	13	434	6.3	8.9	84.8	1.062
	16	362	4.9	11.9	83.2	1.062

Michigan Table 4. Over state trials, yield, specific gravity, and chip color. Average of four locations.

1972			
<u>Variety</u>	<u>Total Yield Cwt/Acre</u>	<u>Specific Gravity</u>	<u>Chip Color</u>
MS-709	501	1.070	5.0
Jewel	470	1.083	3.0
Sioux	432	1.070	7.0
Onaway	426	1.064	7.5
Abnaki	413	1.069	5.5
Raritan	400	1.083	5.0
Shurchip	341	1.064	4.5
Norchip	340	1.074	2.5
Hi Plains	340	1.068	3.5
Wauseon	340	1.068	4.5
MS 645-2	338	1.072	4.8
MS 711-3	304	1.078	3.8
Iallll-2	289	1.064	4.3
Superior	261	1.068	5.0
York	251	1.073	2.8
Rushmore	270	1.062	4.1

MINNESOTA

F. I. Lauer, O. C. Turnquist, E. B. Radcliffe and C. J. Eide

Breeding Program

In potato breeding, emphasis in crossing in 1972 was given to: (1) combining parents having low reducing sugars in cold storage with parents having early maturity, tuber type, high specific gravity, high protein content, yield, and resistance to common scab and late blight; (2) development of parents from unadapted germplasm; (3) and development of genetic stocks resistant to Verticillium wilt and to aphids. Most of the parents used were red or white skinned.

About 25,000 seedlings were grown as transplants in the field at Grand Rapids. Over 14,000 of these involved parents having low reducing sugars in cold storage. Testing of these is done by Roy Shaw at the Potato Processing Laboratory. The remaining 11,000 seedlings were devoted primarily to development of parents from unadapted germplasm, resistance to Verticillium wilt, field resistance to late blight, and adventitious bud producing capability.

Tubers from the Grand Rapids seedlings are grown as multiple-hill units at Crookston for initial selection. In 1972, emphasis was given to a comparison of heterozygous parents from inbred vs non-inbred backgrounds. Subsequent horticultural evaluation of new selections was made at Grand Forks, Elk River, and Grand Rapids. Red, white, and russet selections were included.

Adaptation Trials

To assess the potential of advanced selections as well as new varieties, replicated yield trials are conducted at Crookston, Baker, and Elk River. Variety plots are also grown at Big Lake, Osseo, Brooten, Staples, Fosston, Anoka, Argyle, Grand Rapids, and Hollandale. High-quality seed for these plots is obtained from an isolated $3\frac{1}{2}$ -acre tuber-unit seed increase plot at Embarrass. All seedstock at Embarrass is screened in a tuber-index plot at Homestead, Florida, each winter. Cooking and baking tests are made on the advanced selections at St. Paul and chip tests at E. Grand Forks. In the past two years one of the most promising new varieties was Cascade. Its yield was high and tuber type acceptable. Of the advanced selections tested, Minn. 3866, Minn. 3915, Minn. 3935, Minn. 4536, Minn. 4537, and Minn. 4858 are promising. All have performed well in our trials in the Valley. Minn. 4536, Minn. 4537, and Minn. 4858 also showed promise for early-market use in the Sand Plains area. All are red except Minn. 3915 which is white. The performance of varieties and selections in adaptation plots at Crookston, Minnesota and Elk River, Minnesota is reported in Tables 1 and 2, respectively.

Minnesota Table 1. Potato Variety Adaptation Trial, Crookston, Minnesota 1972.

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Minn 3935	423	96	1.081	19.9
4858	412	97	1.083	20.3
Kennebec	399	99	1.084	20.5
Norchief	396	95	1.086	20.9
4537	393	99	1.072	18.0
Minn 3866	390	91	1.095	22.9
Cascade	383	98	1.079	19.4
Wauseon	373	95	1.087	21.2
H 285-3	368	98	1.080	19.7
Wis 710	364	96	1.074	18.4
4536	362	96	1.074	18.4
Abnaki	357	98	1.091	22.0
3915	354	95	1.086	20.9
5562	353	99	1.069	17.3
5072	344	98	1.084	20.5
4729	342	100	1.081	19.9
B 6495-12	342	95	1.092	22.2
Nebr 139.59-1	341	94	1.082	20.1
Chieftain	339	96	1.076	18.8
4825	332	96	1.084	20.5
Red Pontiac	328	97	1.074	18.4
Nebr 99.56-4	325	97	1.081	19.9
Penn 71	323	99	1.083	20.3
Norgold	321	97	1.081	19.9
Norchip	318	96	1.090	21.8
Irish Cobbler	317	96	1.087	21.2
LA 71-110	314	94	1.082	20.1
B 6097-9	307	94	1.091	22.0
4928	303	94	1.075	18.6
Iopride	297	97	1.078	19.2
5522	296	99	1.089	21.6
ND 6925-13	295	90	1.084	20.5
5907	294	99	1.089	21.6
Early Gem	291	98	1.069	17.3
Norland	287	97	1.078	19.2
Nebr 1.57-1	282	94	1.084	20.5
B 6495-20	282	88	1.109	25.9
Anoka	280	96	1.080	19.7
Raritan	272	94	1.109	25.9
Wis 623	271	95	1.086	20.9
ND 7196-18	266	85	1.074	18.4

(Continued on next page)

Minnesota Table 1. Potato Variety Adaptation Trial, Crookston, Minnesota 1972, con't.

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
Bake-King	259	97	1.094	22.7
LA 71-82	259	93	1.080	19.7
5891	256	98	1.086	20.9
Wis 623	256	97	1.084	20.5
Superior	250	94	1.081	19.9
H 245-2	242	96	1.090	21.8
5849	238	96	1.078	19.2
4929	238	92	1.078	19.2
H 284- 5	237	95	1.070	17.5
ND 7103-4	208	96	1.081	19.9
Russet Burbank	194	96	1.086	20.9
A 6334-19	185	90	1.081	19.9
A 6334-20	164	96	1.077	19.0
Average	308	96	1.083	20.3

Cooperators: Dr. Larry Smith, Agronomist Northwest Experiment Station,
Crookston, Minnesota

Planted: May 25, 1972

Harvested: September 15, 1972

Vines Killed: Rotobeat, September 13, 1972

Spacing: 12" Hills, 40" Rows

Fertilizer: 500 lbs per acre 13-13-13 with planter

Insecticide: Thimet

Fungicide: Polyram

Herbicides: Eptam, 1 lb per acre soil incorporated May 19, 1972

Patoran 6 lbs per acre preemergence May 31, 1972

Minnesota Table 2. Potato Variety Adaptation Trial, Elk River, Minnesota, 1972.

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Cascade	429	87	1.089	21.6
Norchip	410	88	1.092	22.2
Norchief	409	87	1.089	21.6
Minn 3935	399	97	1.088	21.4
5522	390	98	1.081	19.9
Minn 3866	382	86	1.093	22.4
Norland	378	96	1.076	18.8
Abnaki	373	96	1.077	19.0
4825	368	94	1.084	20.5
Chieftain	364	96	1.082	20.1
4537	362	99	1.081	19.9
Iopride	360	88	1.080	19.7
5562	358	97	1.072	18.0
Minn 3915	348	94	1.082	20.1
4536	343	97	1.072	18.0
Penn 71	338	98	1.087	21.2
4928	336	94	1.083	20.3
Irish Cobbler	334	93	1.081	19.9
Norgold	322	96	1.082	20.1
4858	321	94	1.082	20.1
Kennebec	319	96	1.089	21.6
H 285-3	315	93	1.080	19.7
Raritan	313	95	1.093	22.4
Anoka	311	95	1.076	18.8
Superior	309	97	1.089	21.6
5072	309	94	1.075	18.6
Bake-King	302	93	1.102	24.4
4929	302	91	1.073	18.2
4729	299	94	1.091	22.0
Red Pontiac	295	93	1.079	19.4
Wauseon	288	95	1.084	20.5
5907	274	91	1.086	20.9
H 245-2	267	93	1.093	22.4
5891	266	94	1.087	21.2
5849	260	96	1.090	21.8
Russet Burbank	253	93	1.095	22.9
A 6334-19	247	96	1.090	21.8
Early Gem	186	97	1.069	17.3
A 6334-19	173	93	1.090	21.8
H 284-5	154	82	1.077	19.0
Average	319	94	1.084	20.5

(Continued on next page)

Minnesota Table 2. Potato Variety Adaptation Trial, Elk River, Minnesota, 1972, con't.

Cooperator: Glenn Titrud, Sand Plain Experiment Farm, Elk River, Minnesota
Area Extension Agent, Soils, Curtis Klint, Anoka, Minnesota

Planted: April 27, 1972

Harvested: August 2, 1972

Spacing: 12" Hills, 36" Rows

Fertilizer: 1100 lbs per acre 8-16-16 banded
220 lbs per acre 34-0-0 side dressed June 5
100 lbs per acre 34-0-0 side dressed June 16

Herbicide: Eptam 3 lbs per acre soil incorporated April 24

Insecticide: Thimet 14 lbs per acre banded April 27
Thiodan 1 application of 2 lbs
Sevin 7 applications of 2 lbs each

Fungicide: Kocide 101 - 4 applications of 2 lbs each
Manzate D - 4 applications of 2 lbs each

Irrigation: April 27 .50 inches June 18 1.00 inches
May 19 .50 inches June 25 1.00 inches
May 22 .50 inches July 1 1.20 inches
June 2 .50 inches July 8 1.00 inches
June 6 .50 inches July 16 .50 inches
June 13 1.00 inches

MISSISSIPPI

James M. Cannon and Gale R. Ammerman

1972 Replicated and Observational Irish Potato Trials

The 1972 trials were planted on February 23 in a Bosket silt loam soil. Chemical analysis of the soil indicated that the level of phosphorus and potassium were high and a soil pH of 6.30. Two days prior to planting a fertilizer application of 110-20-20 pounds of $N-P_2O_5-K_2O$ per acre was made in the furrow of the row and covered. Thimet was applied just prior to planting at the rate of 30 lbs per acre for insect control. The seedpieces were spaced one foot apart. Plots consisted of one row 40 inches wide and 30 feet long, with five replications. Enide was applied February 24 at the rate of 5 pounds active per acre for weed control. A regular spray schedule using Sevin and Maneb was used for insect and disease control, respectively. During the growing season, 12.4 inches of rain fell. Two supplemental furrow irrigations were made on May 25 and June 5, 1972. The plots were harvested on June 13 and 14, 1972, involving a 120-121 day growing season. After harvesting, the potatoes were graded, specific gravity readings were taken for each plot, and each entry was rated for the following: skin color, smoothness, shape, eye depth, size, internal necrosis, flesh color, tuber maturity, rot, vascular discolor, hollow heart and overall tuber rating. Samples from each entry were chipped, boiled, and canned. The appropriate quality evaluations were made.

Replicated Trials. Thirty-six entries were included in the replicated trials. The breeding lines were from the USDA and Campbell Soup Company breeding programs. Yields ranged from a low of 200 cwt/A for BR6491-1 to a high of 371 cwt/A for the variety Red LaSoda. The specific gravities ranged from 1.062 for BR7066-1 to 1.085 for B6523-3. Twenty-six of the 36 entries had specific gravities of 1.070 and above.

Of 36 lots chipped in 1972, 20 scored in the 4, 5, and 6 range on the potato chip color reference standard or were excellent for color score. Thirty-four of the 36 lots scored in the range of 3 through 7 or were of acceptable color. The boiled potatoes were evaluated on a scale of 5 being too dark and 1 being perfectly white. The average score was 2.04 and the range from 1.20 to 3.90. A visual score of about 3.2 represents the darkest acceptable color, and the Hunter L value range for sample scoring 3.2 was 57 to 69. All of the 36 1972-samples of boiled potatoes had Hunter L values above 57 with the lowest value being 61.3 and the largest 78.0, and the average, 67.7.

The Hunter color values for canned Irish potatoes ranged from 63.80 to 70.45 with a mean of 68.27 for duplicate values in two replications. Commercially canned Irish potatoes ranged from a Hunter L value of 67 to 69. Twenty-nine of the 36 1972-samples had Hunter L scores above 67 or, in other words, were lighter than the commercial canned potatoes. Twenty-eight of the 36 lots scored grade A according to USDA standards. Only 3 of the 36 were off grade due to poor color.

Mississippi Table 1. Yield, % No. 1 tubers, specific gravity, after boiling rating, chip color, and tuber rating for replicated and observational entries at Stoneville, Mississippi--1972.

Entry	Yield ^{1/} (cwt)	% No. 1	Specific Gravity	After boiling ^{2/} darkening	Chip ^{3/} color	Tuber ^{4/} rating
Red LaSoda	371	78.0	1.065	1.54	6.58	2.5
B6097-9	364	64.5	1.080	1.45	3.91	3.0
BR-6446-2	323	56.7	1.069	2.50	6.75	2.5
B6562-14	321	73.0	1.081	2.25	3.74	2.5
BR-6863-7	319	78.9	1.078	1.98	3.16	3.0
BR-6820-26	317	66.4	1.067	1.53	5.66	2.5
Katadin	317	85.8	1.069	1.80	5.08	3.0
BR-5960-5	316	80.2	1.073	3.08	3.75	3.0
BR-6626-5	316	74.1	1.074	1.75	5.58	2.5
BR-6863-1E	313	76.3	1.084	1.75	3.24	2.5
B6603-12	312	77.4	1.078	1.43	3.66	3.0
Alamo	310	71.4	1.064	1.48	5.33	3.0
BR-6863-8E	301	82.1	1.083	1.33	3.41	2.5
B6751-3	299	64.1	1.071	1.20	5.57	2.5
LaChipper	294	77.3	1.069	1.85	3.83	2.5
BR-6864-11E	293	70.3	1.068	1.80	5.41	2.5
BR-6463-2	292	70.8	1.074	2.00	5.25	2.5
Superior	292	83.9	1.075	1.63	4.83	3.0
B6518-5	290	64.1	1.082	2.00	4.58	3.0
Seminole	288	69.5	1.081	1.88	4.66	2.5
Kennebec	285	69.9	1.065	2.25	9.00	2.5
Norchip	284	40.4	1.076	2.00	4.99	3.0
B6532-3	282	42.3	1.085	1.75	6.83	2.5

Table 1 (cont.)

Entry	Yield ^{1/} (cwt)	% No. 1	Specific Gravity	After boiling ^{2/} darkening	Chip ^{3/} color	Tuber ^{4/} rating
BR-7085-1	279	73.6	1.082	2.55	4.20	2.5
BR-6862-5E	278	76.3	1.075	2.50	4.83	2.5
BR-6864-9	266	82.1	1.073	2.48	3.83	3.0
BR-7066-1	266	56.5	1.062	2.10	4.83	2.5
BR-7108-1	261	82.2	1.080	3.90	4.83	2.5
B6527-33	258	60.6	1.075	2.45	4.08	2.5
BR-6863-3	234	68.9	1.082	1.75	2.33	3.0
BR-6491-5	227	46.8	1.080	2.08	4.16	2.5
BR-7093-6	226	68.3	1.070	1.25	4.16	3.0
BR-5960-13	223	77.9	1.078	2.75	4.58	2.5
BR-6864-6E	216	80.7	1.071	1.13	4.58	3.0
BR-6859-3	208	61.8	1.064	2.85	6.75	3.0
BR-6491-1	200	70.3	1.081	3.25	3.75	3.0
LSD	5%	50	11.7	0.004		
Observational Lines						
B6516-3	137	34.3	1.083	2.00	6.16	
B6516-5	223	48.0	1.080	1.75	4.83	
B6516-18	218	74.3	1.071	2.00	5.16	
B6516-20	219	34.7	1.077	1.75	4.83	
B6516-26	235	69.4	1.077	1.50	3.16	
B6532-14	193	36.3	1.080	1.25	6.00	

1/ Average of five replications.

2/ 1 = no darkening; 5 = severe darkening. Each visual rating is the average of 5-member panel based on two combined replications from the trials.

3/ Visual ratings based on the International Potato Chip Institute Color Reference Standard. Each rating is the average of a 5-member panel based on two combined replications from the test.

4/ Based on yield, appearance at harvest, rotting, second growth, heat sprouts, cracking, etc.
1 = poor; 5 = excellent.

Mississippi Table 2. The internal characteristics of 36 entries of potatoes grown in Stoneville,
Mississippi--1972^{1/}

Entry	Internal necrosis	Flesh color	Tuber Maturity	Rot	Vascular discolor	Hollow heart
Red LaSoda	5.0	3.6	4.8	5.0	4.6	5.0
B6097-9	5.0	3.9	5.0	4.8	4.8	5.0
BR-6446-2	5.0	3.5	5.0	5.0	5.0	4.8
BR-6562-14	5.0	3.8	4.6	5.0	5.0	5.0
BR-6863-7	5.0	3.8	4.8	5.0	5.0	4.8
BR-6820-26	5.0	3.7	5.0	5.0	5.0	5.0
Katadin	4.8	3.6	4.8	5.0	5.0	5.0
BR-5960-5	4.8	4.1	4.8	5.0	5.0	4.8
BR-6626-5	5.0	4.0	4.8	5.0	5.0	5.0
BR-6863-1E	5.0	3.7	5.0	5.0	5.0	4.8
B6603-12	4.6	3.6	5.0	5.0	5.0	5.0
Alamo	5.0	4.0	5.0	5.0	4.8	5.0
BR-6863-8E	5.0	3.6	5.0	4.8	5.0	4.0
B6751-3	5.0	3.2	4.4	4.8	4.8	5.0
LaChipper	5.0	3.9	5.0	5.0	5.0	4.8
BR-6864-11E	5.0	3.9	5.0	5.0	5.0	4.8
BR-6463-2	5.0	3.7	4.8	5.0	5.0	5.0
Superior	4.8	3.5	5.0	5.0	5.0	5.0
B6518-5	5.0	3.8	5.0	5.0	5.0	5.0
Seminole	4.8	3.6	5.0	5.0	5.0	4.4
Kennebec	5.0	4.0	4.6	5.0	5.0	5.0
Norchip	5.0	3.6	4.8	5.0	5.0	5.0
B6532-3	5.0	3.6	4.6	5.0	4.8	4.8

Table 2 (cont.)

Entry	Internal necrosis	Flesh color	Tuber Maturity	Rot	Vascular discolor	Hollow heart
BR-7085-1	4.8	3.4	4.8	4.8	4.8	4.4
BR-6862-5E	4.4	3.5	4.8	4.8	4.8	4.8
BR-6864-9	5.0	3.5	5.0	5.0	5.0	5.0
BR-7066-1	5.0	3.8	5.0	5.0	5.0	4.6
BR-7108-1	5.0	3.8	5.0	5.0	5.0	5.0
B6527-33	4.8	3.4	4.8	4.8	4.8	4.0
BR-6863-3	4.8	4.0	5.0	5.0	5.0	5.0
BR-6491-5	4.8	3.9	5.0	5.0	5.0	5.0
BR-7093-6	4.6	3.6	5.0	5.0	5.0	5.0
BR-5960-13	5.0	4.0	4.4	5.0	5.0	5.0
BR-6864-6E	5.0	3.6	5.0	5.0	5.0	5.0
BR-6859-3	5.0	3.5	5.0	5.0	4.8	4.0
BR-6491-1	4.8	3.9	5.0	5.0	5.0	5.0
LSD 5%	0.4	0.3	NS	NS	NS	0.5

1/ 1 = poor to 5 = excellent. Average of five replications.

Mississippi Table 3. Quality evaluations of canned Irish potatoes from the replicated trials at Stoneville, Mississippi^{1/}

Entry	(20) Color	(20) Uniformity	(40) Defects	Texture	(100) Total Score	Asco Firmness Values	
						Unit Firmness	2/ Diameter
Red LaSoda	19.0	18.0	37.0	19.5	93.5	12.25	3.94
B6097-6	17.5	18.0	36.0	19.0	91.5	15.75	3.30
BR-6446-2	15.0	18.0	34.5	19.0	86.5	16.50	3.25
B6562-14	20.0	18.0	35.0	20.0	96.0	11.25	3.50
BR-6863-7	19.0	18.0	35.0	19.5	91.5	20.00	3.58
BR-6820-26	18.0	18.0	36.0	19.0	91.0	16.25	3.58
Katadin	18.0	18.0	36.5	19.0	91.5	17.25	3.19
BR-5960-5	15.0	18.0	34.5	19.5	87.0	23.25	3.59
BR-6626-5	19.5	18.0	38.0	20.0	95.5	15.75	3.34
BR-6863-1E	19.0	18.0	37.5	19.5	95.0	13.50	3.46
B6603-12	19.0	18.0	37.0	19.0	93.0	13.25	3.65
Alamo	19.5	18.0	37.5	20.0	95.0	13.75	3.38
BR-6863-8E	20.0	18.0	35.0	19.0	92.0	15.25	3.56
B6751-3	19.0	18.0	35.0	19.0	91.0	15.25	3.23
LaChipper	20.0	18.0	36.0	20.0	94.0	14.00	3.05
BR-6864-11E	19.5	18.0	34.5	19.5	92.0	18.75	3.51
BR-6463-2	17.0	18.0	34.0	19.0	85.5	16.00	3.19
Superior	19.5	18.0	35.0	19.0	93.0	13.50	3.45
B6518-5	19.0	18.0	37.5	20.0	94.5	8.75	3.26
Seminole	18.5	18.0	34.5	18.5	88.5	22.50	3.89
Kennebec	19.0	18.0	38.0	20.0	95.0	17.50	3.25
Norchip	18.5	18.0	34.5	18.5	89.5	14.50	3.15
B6532-3	19.0	18.0	36.0	19.0	92.0	16.50	3.15

Table 3 (cont.)

Entry	(20) Color	(20) Uniformity	(40) Defects	Texture	(100) Total Score	Asco Firmness Values	
						Unit Firmness ^{2/}	Diameter
BR-7085-1	17.0	18.0	27.0	19.5	80.0	13.25	3.43
BR-6862-5E	17.0	18.0	24.0	19.0	78.0	25.00	3.37
BR-6864-9	18.0	18.0	34.0	19.0	89.0	20.25	3.59
BR-7066-1	19.0	18.0	35.5	19.5	93.0	16.25	3.81
BR-7108-1	19.5	18.0	35.0	19.0	93.0	11.25	3.50
B6527-33	17.5	18.0	25.0	17.0	77.5	23.25	3.78
BR-6863-3	20.0	18.0	36.0	19.0	93.0	24.25	3.26
BR-6491-5	19.5	18.0	37.5	19.0	93.0	24.25	3.26
BR-7093-6	18.0	18.0	33.5	19.5	91.0	14.00	3.30
BR-5960-13	19.0	18.0	35.5	19.5	92.0	17.75	3.38
BR-6864-6E	20.0	18.0	35.0	20.0	93.0	11.75	3.79
BR-6859-3	19.0	18.0	32.0	19.0	88.0	15.75	3.74
BR-6491-1	15.5	18.0	34.0	19.0	86.5	25.75	3.06

1/ Subjective scores are the average of 5 panel members and 2 combined replications from the trials.

2/ The larger the number the less firm the potato.

NEW JERSEY

C. E. Cunningham, F. L. Merwarth, T. E. Snyder, and G. S. McWalter

Campbell Institute for Agricultural Research

Approximately 41,000 first-year seedlings were grown at Perham, Maine, from which 1219 clones were selected for planting in 16-hill rows in 1972. One hundred and seventy clones were saved from 1659 clones in 16-hill rows. One hundred and fifty-six clones were saved from 217 100-hill rows for selection following results of processing tests. Advanced selections were planted in seed-increase plots and variety trials.

Data reported are from replicated trials in California, Maine, New Jersey, South Carolina, and Virginia. Planting and harvest dates, fertilization, and cultural practices were similar to those for the different areas. Samples were evaluated for processing characters in laboratories at Cinnaminson, New Jersey, or Perham, Maine.

Campbell Table 1 . Yield, specific gravity, chip color and tuber rating of selections and varieties grown for evaluation in soups at Shirley, New Jersey -- 1972

Selection	Yield above 2 nd		Specific ^{1/} Gravity	Chip ^{2/} Color	Tuber ^{3/}
	Cwt./A	%			
BR6446- 2	217	85	60	5.0	3
BR6456- 1	220	81	68	4.5	3+
BR6626- 5	268	82	75	3.7	3
BR6820-16	217	71	58	3.6	3
BR6820-26	165	58	55	6.3	3
BR6850-16E	97	48	61	5.2	2+
BR6862- 2	250	86	64	3.8	3
BR6862- 5E	195	67	66	3.7	2+
BR6864- 9	189	73	55	3.9	3
BR6864- 1E	280	82	60	3.3	2+
BR6864- 5E	213	75	62	4.5	2+
BR6864- 6E	199	73	60	4.7	3+
BR6864- 8E	118	56	64	4.5	3
BR6864- 9E	245	79	66	3.3	2+
BR6864-11E	252	75	67	4.1	2+
BR7066- 1	136	59	56	6.1	3
BR7068- 3	190	77	73	3.4	3
BR7104-10	221	58	71	4.2	3
Katahdin (check)	204	78	66	4.7	2+
Wauseon	207	76	59	3.7	3+
Mean	204		63	4.3	
LSD (.05)	40		5	0.8	
(.01)	53		7	1.1	

1/ 1.0 deleted

2/ 1 = Light to 10 = Dark brown PCT Color Scale

3/ 1 = Poor to 5 = Excellent

Campbell Table 2. Yield, specific gravity, chip color and tuber rating of selections and varieties grown for evaluation in frozen products at Shirley, New Jersey -- 1972

Selection	Yield above 2"		Specific ^{1/} Gravity	Chip ^{2/} Color	Tuber ^{2/} Rating
	Cwt./A	%			
BR5960-13	165	80	80	3.6	2+
BR6316- 5	240	83	79	3.2	3
BR6491- 1	220	86	80	3.1	3+
BR6626- 5	259	80	74	3.8	4
BR6850-13E	241	80	63	4.3	2+
BR6850-23E	130	64	62	3.5	2+
BR6859- 3	243	87	56	5.8	2+
BR6863- 3	271	90	85	3.2	3+
BR7044- 2	258	77	66	5.0	2+
BR7061- 3	228	87	59	3.6	3+
BR7071- 4	97	51	56	3.2	3
BR7082- 2	239	71	74	4.3	3
BR7085- 1	247	78	80	3.5	3+
BR7093- 4	200	80	63	3.9	3
BR7093- 6	220	83	63	3.2	3
BR7093- 9	236	88	74	3.0	3
BR7093-20	210	83	66	3.4	3
BR7096- 1	257	81	62	3.9	2+
BR7102- 4	189	74	82	3.4	3
BR7103- 7	248	87	71	3.6	3+
BR7108- 1	264	84	82	3.1	2+
BR7108- 3	179	70	77	3.3	3
Katahdin	207	81	65	4.0	3
Kennebec (check)	246	82	69	3.6	2+
Norchip	234	79	68	3.7	2+
Raritan	287	86	84	3.3	3
Mean	223		71	3.7	
13D (.05)	48		4	0.6	
(.01)	63		6	0.8	

^{1/} 1.0 deleted

^{2/} 1 = light to 10 = Dark brown PCI Color Scale

^{3/} 1 = Poor to 5 = Excellent

Campbell Table 3. Yield, specific gravity and chip color of selections and varieties grown at Parkesley, Virginia -- 1972.

<u>Selection</u>	<u>Yield above 2"</u> <u>Cwt./A</u>	<u>Specific</u> ^{1/} <u>Gravity</u>	<u>Chip</u> ^{2/} <u>Color</u>
BR5960- 5	224	77	4.0
BR5960-13	182	83	3.5
BR6316- 5	233	73	3.5
BR6491- 1	130	82	3.0
BR6491- 5	146	83	4.0
BR6859- 3	205	69	4.4
BR6863- 3	185	74	3.0
BR6863- 7	233	77	3.2
BR6863-14E	162	78	3.1
BR7044- 2	142	71	4.4
BR7046- 1	189	70	4.0
BR7076- 3	110	72	3.7
BR7083- 3	102	76	3.9
BR7085- 1	178	71	4.1
BR7088- 2	195	80	4.1
BR7089- 1	182	70	4.1
BR7093- 6	123	69	3.9
BR7093- 9	125	72	3.3
BR7093-20	111	78	3.4
BR7102- 4	174	75	4.0
BR7103- 7	206	80	3.5
BR7105-10	223	67	3.0
BR7108- 1	169	77	3.9
Norland	76	58	3.7
Norchip	185	75	3.3
Kennebec	230	66	3.3
Pungo (check)	265	71	3.7
Superior	210	67	4.2
Mean	175	74	3.7
LSD (.05)	52	5	1.0
(.01)	68	8	1.3

^{1/} 1.0 deleted

^{2/} 1 = Light to 10 = Dark brown PCI Color Scale

Campbell Table 4. Yield, specific gravity and chip color of selections and varieties grown at Clemson University Truck Crops Experiment Station, Charleston, South Carolina -- 1972^{1/}

<u>Selection</u>	<u>Yield Cwt./A</u>	<u>Specific^{2/} Gravity</u>	<u>Chip^{3/} Color</u>
BR5960- 5	282	78	4.1
BR5960-13	278	78	3.8
BR6316- 5	290	75	3.1
BR6463- 2	215	78	3.9
BR6491- 1	218	84	3.5
BR6491- 5	203	88	3.6
BR6626- 5	250	71	6.2
BR6859- 3	206	79	6.0
BR6863- 3	181	81	3.0
BR6863- 7	250	78	3.5
BR6863- 8E	225	83	3.0
BR7046- 1	272	77	4.0
BR7083- 1	202	92	5.6
BR7083- 3	184	78	4.2
BR7085- 1	228	83	3.9
BR7093- 6	216	70	3.2
BR7093-22	247	82	3.0
Kennebec	289	76	5.4
LaChipper	307	72	4.0
Norchip (check)	292	80	3.3
Mean	241	79	4.0
LSD (.05)	38	5	0.8
(.01)	50	7	1.0

^{1/} Dr. W. R. Sitterly cooperating

^{2/} 1.0 deleted

^{3/} 1 = Light to 10 = Dark brown, PCI Color Scale

Campbell Table 5. Yields, specific gravity and chip color of selections grown at Arvin, California -- 1972.

Selection	Yield U.S. No. 1		Specific ^{1/} Gravity	Chip ^{2/} Color
	Cwt./A	%		
BR6446- 2	231	88	75	4.3
BR6456- 1	215	82	72	5.2
BR6626- 5	200	73	74	4.9
BR6820-26	221	83	69	3.7
BR6862- 2	200	91	76	3.0
BR6862- 5E	227	87	72	4.3
BR6863- 3	163	88	78	2.0
BR6864- 6E	230	88	71	3.7
BR6864- 9	221	90	70	3.2
BR6864-11E	246	85	71	4.4
BR7066- 1	209	85	65	4.3
BR7085- 1	134	83	75	3.7
BR7088- 2	142	65	83	3.0
BR7091- 1	296	92	65	3.2
BR7093- 4	157	80	74	3.1
BR7103- 2	203	89	88	3.7
BR7104-10	205	86	71	3.4
CA25- 1	225	88	81	4.0
CA46-15	153	80	72	3.9
CA60- 2	141	88	72	4.5
Kennebec (check)	261	91	81	3.6
White Rose	95	56	69	5.7
Mean	199	84	74	4.0
LSD (.05)	67	7	4	0.6
(.01)	89	9	5	0.8

^{1/} 1.0 deleted

^{2/} 1 = Light to 10 = Dark brown, PCI Color Scale

Campbell Table 6. Yield, specific gravity and tuber rating for selections evaluated for frozen products, Perham, Maine --1972

<u>Selection</u>	<u>Yield above 2"</u>		<u>Specific^{1/} Gravity</u>	<u>Tuber^{2/} Rating</u>
	<u>Cwt./A</u>	<u>%</u>		
CA06- 5	372	90	73	3+
CA06- 7	255	85	73	2
CA10-11	373	93	75	3
CA23- 5	313	84	84	2+
CA23- 6	385	96	83	3+
CA24- 7	337	77	70	2+
CA25- 1	372	92	82	3+
CA25- 3	385	92	79	3
CA26- 2	418	93	79	3+
CA26-11	382	89	77	3
CA28- 2	373	86	74	3
CA28-12	438	93	77	2+
CA40- 7	448	93	77	3
CA44- 1	355	94	74	3
CA46-11	416	93	75	3
CA46-15	462	92	68	3+
CA48-13	363	93	70	3
CA52- 5	357	87	68	3+
CA54-32	379	84	72	3
CA55- 8	294	79	78	3+
CA60-24	351	93	76	2+
CA61- 3	317	84	77	2+
BR6463- 2	346	88	79	2+
BR6863- 7	390	89	79	3+
BR6491- 5	334	82	91	3
Norchip	397	88	72	2+
Kennebec (check)	474	95	71	2+
R. Burbank	361	83	79	2
Mean	373		76	
LSD (.05)	53		5	

^{1/} 1.0 deleted

^{2/} 1 = Poor to 5 = Excellent

Campbell Table 7. Yield, specific gravity and tuber rating for selections evaluated for frozen products, Perham, Maine --1972.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating
	Cwt./A	%		
BR5960-13	368	93	82	3
BR6316- 5	413	92	77	3+
BR6491- 1	326	92	88	3
BR6626- 5	428	93	79	3
BR6850-13E	420	94	75	2+
BR6850-23E	312	87	77	2+
BR6859- 3	385	93	60	3
BR6863- 3	366	94	82	3+
BR7044- 2	403	89	80	3
BR7061- 3	310	92	69	2
BR7071- 4	344	89	75	4
BR7082- 2	345	86	72	2+
BR7085- 1	332	89	82	3
BR7093- 4	414	92	74	3+
BR7093- 6	346	91	78	3
BR7093- 9	345	93	76	2+
BR7093-20	315	91	79	3
BR7096- 1	445	92	73	3
BR7097- 2	338	91	73	3
BR7102- 4	393	88	80	3
BR7103- 7	402	92	79	3
BR7108- 1	372	91	80	3
BR7108- 3	413	91	79	3
Katahdin	366	94	71	3+
Kennebec (check)	445	93	74	3
Norchip	357	87	80	3
Raritan	384	89	87	2+
R. Burbank	321	79	81	2+
Mean	371		77	
LSD (.05)	52		5	

^{1/} 1.0 deleted

^{2/} 1 = Poor to 5 = Excellent

Campbell Table 8. Yield and specific gravity of selections evaluated for soups, Perham, Maine -- 1972.

Selection	Yield above 2" Cwt./A	%	Specific Gravity	Selection	Yield above 2" Cwt./A	%	Specific Gravity
BR6446- 2	439	96	71	BR6863-12E	351	87	72
BR6456- 1	382	94	71	BR7056- 4	363	90	63
BR6626- 5	430	96	74	BR7056- 6	342	88	62
BR6820-16	395	86	64	BR7062- 4	350	88	80
BR6820-26	457	90	67	CA02- 2	333	92	70
BR6850-16E	354	89	71	CA02- 7	353	93	62
BR6862- 2	391	95	79	CA02- 8	420	94	64
BR6864- 9	366	91	69	CA92-13	382	91	65
BR6864- 1E	402	94	70	CAL1- 3	328	92	75
BR6864- 5E	362	91	70	CAL1-15	380	96	69
BR6864- 6E	304	91	66	CAL6-11	362	96	62
BR6864- 8E	385	90	71	CA27- 6	422	92	72
BR6864- 9E	383	90	71	CA29- 9	421	97	76
BR6864-11E	386	77	66	CA29-11	425	94	75
BR7066- 1	413	93	68	CAL6-29	254	94	75
BR7068- 3	378	95	76	CAL7-12	337	93	71
BR7104-10	454	91	70	CA60- 2	433	96	72
Katahdin (check)	361	94	70	CA60-28	300	94	68
Wauseon	352	93	71	Katahdin (check)	408	95	74
				Wauseon	361	94	70
Mean	371		70		366		70
LSD (.05)	57		7		56		6

1/ 1.0 deleted

Campbell Table 9. Yield and specific gravity of selections in late maturity trials, Perham, Maine -- 1972.

Selection	Yield above 2" Cwt./A	%	Specific Gravity	Selection	Yield above 2" Cwt./A	%	Specific Gravity
BR6246- 1	447	94	61	BR6835- 1E	374	87	75
BR6900- 2	412	95	58	BR6835- 4E	397	91	68
BR7103- 1	453	94	75	BR6835- 5E	398	90	68
BR7103- 2	377	94	77	BR6863- 5E	397	86	78
BR7105-10	410	91	68	BR6863- 7E	332	94	75
BR7105-14	453	89	73	BR6863-14E	352	86	82
BR7106- 1	324	90	85	BR7046- 1	364	96	85
BR7106- 5	338	92	81	BR7072- 5	471	92	69
BR7106-13	308	93	79	BR7076- 3	411	90	70
BR7108- 2	427	93	85	BR7088- 2	343	89	74
BR7117- 1	369	96	72	BR7088-18	368	89	86
CAL1-13	434	97	64	BR7089- 1	413	93	82
CA26- 4	440	96	70	BR7089- 6	393	91	86
CA41- 5	433	96	69	BR7091- 1	456	95	64
CA42- 1	438	94	66	BR7093- 5	392	95	77
CA63- 1	427	96	71	BR7093-23	401	91	77
CA65-10	321	91	70	BR7117-25	415	94	71
CA65-15	350	89	75	B 6987-184	370	93	90
CA67- 2	462	97	70	Katahdin (check)	406	96	70
Katahdin (check)	409	96	72	Kennebec	464	95	72
Kennebec	462	95	70	Wauseon	366	91	76
Wauseon	382	92	71				
Mean	403		72		389		76
LSD (.05)	35		5		50		6

L/ 1.0 deleted

Campbell Table 10. Yield, specific gravity and tuber rating of selections from several breeding programs, Perham, Maine -- 1972.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating
	Cwt./A	%		
A63126-2 Rus	277	78	79	2+
A64206-4 Rus	248	74	80	2+
B6495-12	266	87	80	3
B6532-4	356	90	77	3
B6532-10	240	78	80	4
B6692- 5	352	91	69	4
B6712-17	356	94	76	3+
B6955-14	416	95	80	3
CA60- 5	382	93	75	2+
F5810	390	91	80	3+
F6208	400	89	78	4+
F6542	348	90	78	3
F6589 Variable red	354	92	71	3+
F65044	331	90	81	3
F6609	338	91	71	3
Neb. 1-57-1	300	86	67	2+
Neb.49-62-5	254	80	75	2+
Neb.93-55-16	290	81	74	3
Cascade	377	89	62	3+
Hudson	395	94	68	2+
Katahdin	376	93	69	3+
Kennebec	412	94	73	3
Raritan	312	93	89	4
R. Burbank	360	82	76	2
Mean	339		75	
LSD (.05)	73		6	

^{1/} 1.0 deleted

^{2/} 1 = Poor to 5 = Excellent

NEW JERSEY

Melvin R. Henninger

USDA Seedlings

Eighty USDA seedlings and five named varieties were planted in a two-replication, randomized block. Plots were ten feet long and seedpieces were spaced ten inches apart in 36-inch rows. All plots were planted on April 19 and harvested August 28. There were 1300 lbs/A of 16-8-8 fertilizer applied below and to the side of the row at planting time. Heavy rains until mid-July caused leaching of nitrogen which may have reduced yields of the late maturing varieties. Irrigation was needed weekly during late July and August. Extended periods of above 90° F temperature and 90% humidity, in addition to very poor air quality during July and August, produced severe speckle symptoms to many seedlings. Speckle leaf ratings were recorded and varied from one = little injury to five = severe injury. A rating of four or five may have caused yield reductions.

New Jersey Table 1. Yields, Specific Gravity, and Speckle Leaf Ratings for 80 USDA Potato Seedlings and Five Varieties in 1972.

Seedling Number	Yield Cwt/A		Percentage Over		Specific Gravity	Speckle Leaf Rating	
	Over 1-7/8"	Total	1-7/8"	2-1/2"		7/11	7/20
B6814-16	343	378	91	49	-	2	3
B6928-10	206	232	89	24	1.054	5	5
B6952-3	306	350	88	48	1.082	3	4
B6955-24	259	294	88	29	1.065	3	5
B6955-33	336	356	94	66	1.073	2	5
B6955-35	341	365	94	62	1.085	2	4
B6986-2	413	422	98	86	1.069	1	3
B6986-18	308	323	96	76	1.067	5	5
B6987-29	313	334	94	56	-	4	4
B6987-37	257	305	84	38	1.080	3	4
B6987-43	348	352	99	85	1.075	3	5
B6987-54	282	298	95	68	1.060	5	5
B6987-56	335	351	96	56	1.081	3	4
B7024-6	334	360	92	53	-	4	3
B7138-11	292	337	86	31	1.088	2	3
B7139-12	225	253	88	54	1.053	4	4
B7143-12	124	146	86	32	1.056	2	3
B7145-1	215	294	73	19	1.043	4	4
B7145-3	213	267	80	14	1.048	5	5
B7147-8	68	120	56	10	1.068	3	5

New Jersey Table 1. (Continued)

Seedling Number	Yield Cwt/A		Percentage		Specific Gravity	Speckle Leaf Rating	
	Over	Total	Over			7/11	7/20
	1-7/8"		1-7/8"	2-1/2"			
B7147-17	246	294	84	40	1.072	2	4
B7147-83	167	183	92	50	-	1	3
B7147-90	204	218	92	45	1.079	2	3
B7151-1	336	362	93	58	1.090	2	2
B7159-26	333	344	97	73	1.054	2	4
B7164-25	238	257	92	42	1.061	2	3
B7167-2	219	260	84	32	1.068	4	5
B7167-30	300	315	96	70	1.068	4	5
B7188-2	235	252	93	67	1.058	1	1
B7196-23	267	298	90	56	1.068	1	2
B7196-27	206	238	86	29	1.070	2	3
B7196-29	217	238	92	62	-	2	3
B7196-30	198	214	93	46	1.066	3	4
B7196-36	112	152	74	13	1.052	4	5
B7196-37	146	205	72	3	-	4	5
B7196-40	172	218	79	25	-	4	5
B7196-74	142	180	78	16	-	5	5
B7200-26	240	280	86	29	1.064	2	3
B7221-7	328	375	86	43	1.089	3	3
B7252-3	324	366	88	46	1.069	2	4
B7572-2	218	248	88	40	1.091	3	4
B7572-4	282	300	94	67	1.083	3	3
B7573-3	207	240	86	36	1.066	3	4
B7573-7	297	334	88	39	1.083	2	3
B7579-1	280	305	92	54	1.076	3	4
B7582-1	282	306	92	49	1.075	2	4
B7584-6	295	326	90	57	1.089	2	3
B7584-8	276	292	94	68	1.075	4	4
B7585-3	254	337	75	17	1.083	3	5
B7585-9	260	292	89	51	1.105	2	3
B7590-6	239	286	83	36	1.059	3	4
B7592-1	247	290	85	36	-	3	4
B7595-7	158	277	57	7	-	3	4
B7602-7	284	310	92	63	1.063	4	4
B7602-9	180	216	84	24	1.077	2	4
B7612-5	174	215	80	14	1.068	4	5
B7618-6	240	260	92	52	1.069	3	4
B7619-12	207	232	89	67	1.077	4	4
B7620-4	322	358	90	54	1.072	3	4
B7620-7	306	366	84	42	-	4	4

New Jersey Table 1. (Continued)

Seedling Number	Yield Cwt/A		Percentage Over		Specific Gravity	Speckle Leaf Rating	
	Over 1-7/8"	Total	1-7/8"	2-1/2"		7/11	7/20
B7621-2	382	400	96	75	1.066	2	3
B7621-10	254	313	81	24	1.075	3	3
B7622-1	312	336	93	68	1.075	3	3
B7629-6	267	340	78	28	-	4	4
B7630-1	343	394	87	46	1.088	1	2
B7630-2	274	294	94	58	-	3	3
B7631-3	288	305	94	48	-	2	4
B7631-4	448	467	96	68	1.057	3	4
B7633-2	342	396	86	52	-	1	2
B7633-6	275	382	72	18	-	2	3
B7634-1	160	200	80	20	-	3	5
B7634-2	290	302	96	64	1.057	3	5
B7635-1	260	304	86	22	1.055	5	5
B7635-4	252	290	85	41	1.067	3	4
B7636-4	396	448	90	86	1.074	2	4
B7642-1	230	273	87	36	1.061	4	5
B7650-17	79	140	52	0	-	5	5
B7659-17	272	360	75	18	1.072	2	3
B7673-2	292	366	80	23	1.059	3	4
B7766-2	307	328	93	46	-	2	4
Kennebec	376	422	88	42	1.071	2	2
Superior	312	330	95	56	1.063	3	4
Norchip	267	312	85	30	1.071	3	3
Norgold R.	357	400	90	50	1.065	4	5
Cascade	248	298	84	20	1.056	5	5
Duncan's Mod. LSD 5% Coef. of Variability	92 18	95 16	11 6	19 22			

NEW YORK

R. E. Anderson, B. B. Brodie and M. B. Harrison

Resistance to the Potato Cyst Nematode

Populations of clones derived from diploid species of potatoes are being screened for new sources of resistance to aggressive forms of the potato cyst nematode. The most advanced materials derive from Solanum vernei, S. multidissectum, S. spgazzinii, and S. Sanctae-Rosae. Each of these species contain one or more loci conferring resistance to race A, the golden nematode, based on trials at the USDA Nematology Laboratory in Ithaca and at the Nematode Research Laboratory on Long Island. Data from research in Peru indicate that certain clones selected for resistance to race A are also tolerant or resistant to one or more of the populations of nematodes used in screening trials at Huancaayo and LaMolina. Tubers of 700 clones grown in 1971 or in the greenhouse in early 1972 are currently undergoing increase and screening for resistance in Peru. These results may indicate in which of these species the better sources of resistance are likely to be found.

It seems likely that clones giving resistance to the aggressive pathotypes in Peru will also be resistant to race A in New York. Thus progenies could be screened first in the New York laboratories, and only resistant clones need be sent to Peru for further screening. However, some clones which tested as susceptible to race A were sent to Peru to check on the possibility that there are two or more completely independent processes governing resistance.

Eighty-eight accessions of 25 diploid species have been received in the past year and will be added to the breeding program in 1973. Resistant diploid germplasm used as parents in hybrid crosses in 1972 included 10 vernei clones, 4 multidissectum clones, 3 Sanctae-Rosae clones, and 40 spgazzinii clones. Seed produced includes intra-specific hybrids, and crosses to diploid and tetraploid tuberosums. Resistant tetraploid clones used in seed production had been derived from the same four diploid species. Crosses were made with adapted varieties of S. tuberosum. The resistance from the Sanctae-Rosae parents is found in a high proportion of its progenies; in addition, many of the resistant clones receive zero ratings for cysts rather than the acceptable 1-5 rating level.

Seedlings from 75 interspecific crosses of diploid Solanum clones with resistance to race A (zero cyst ratings) were grown in the field in 1972. Approximately 6000 of the seedlings produced tubers; each clonal line will be tested at Ithaca and at Farmingdale for reaction to race A, and in Peru for reaction to the nematode populations indigenous in the Sierras. The Max-Planck-Institut is interested in testing the more promising lines for resistance to the cyst nematodes of Western Europe. Colombia is another possible testing location.

Two hundred fourteen diploid and tetraploid breeding lines were increased in the field to provide additional tubers for use by other interested potato breeding programs.

New York

B. B. Brodie

Field Performance of Potato Breeding Lines
in Golden Nematode Infested Soil

Twenty-three breeding lines of potatoes were evaluated for yield, specific gravity and tuber appearance in golden nematode-infested soil at the Nematode Research Farm in Steuben County, New York. The breeding lines were planted in 10-hill plots with 12-inch spacing between hills. Each line was replicated three times. Golden nematode population density averaged 300 cysts per 150 ml of soil. Because of a lack of facilities at the farm, data on cyst development on root systems could not be taken. Consequently, only data on yield, specific gravity, and general appearance of tubers are given. The breeding lines were compared to Katahdin, a golden nematode-susceptible variety.

The 1972 growing season was characterized by above normal rainfall and below normal temperatures. Golden nematode development on the susceptible Katahdin was moderate and did not cause above-ground symptoms.

In the 1972 trial, 17 of the breeding lines yielded more than did Katahdin (New York Table 1). These lines were predominately in the B6987, B7151, B7155, and B7608 groups. Highest yields were obtained with lines B7151-7, B7151-9, B7151-10, and B7155-3. Specific gravity of these high yielding lines was equal to or higher than that of Katahdin. Increased yields can be attributed in part to golden nematode resistance or tolerance.

New York Table 1. Yield, specific gravity and general appearance of potatoes from Heterodera rostochiensis infested soil

Variety	Total yield per acre	Specific gravity	General appearance ^{1/}		
			Size	Shape	Color
	cwt				
Katahdin	203	1.081	good	good	good
B6595-12	157	1.098	undersize	good	good
B6741-2	180	1.083	undersize	good	good
B6741-3	185	1.079	undersize	good	good
B6741-11	223	1.085	good	good	good
B6799-1	244	1.079	good	good	good
B6986-2	235	1.088	oversize	irregular	good
B6987-2	132	1.052	undersize	good	good
B6987-18	272	1.084	over & undersize	good	good
B6987-22	232	1.093	good	good	good
B6987-25	281	1.091	good	good	good
B6987-29	236	1.084	undersize	poor	good
B6987-43	216	1.094	good	good	good
B6987-56	241	1.094	good	good	good
B7151-7	310	1.089	good	good	good
B7151-9	295	1.082	undersize	good	good
B7151-10	317	1.074	over & undersize	good	good
B7155-3	364	1.088	good	good	good
B7200-2	247	1.081	good	good	poor
B7608-2	185	1.086	good	fair	poor
B7608-3	214	1.076	good	poor	poor
B7608-4	202	1.075	fair	fair	poor
B7610-1	223	1.095	good	poor	good
B7633-1	215	1.078	undersize	good	good

^{1/} Determined from 8 lb. sample and based on U.S. No. 1 grade

NEW YORK (LONG ISLAND)

R. C. Cetas

Evaluation of Potato Cultivars and Breeding Lines for Scab
and Verticillium Wilt Resistance on Long Island in 1972

Scab. Thirty-five cultivars and breeding lines of potatoes were evaluated for scab resistance in soils that were naturally infested with Streptomyces scabies at the Long Island Vegetable Research Farm, Riverhead, New York in 1972. The pH of the soil was 5.3 to 6.1 when determined in 0.01N CaCl₂ and 5.9 to 6.1 when determined in water on October 27, 1972. The seedpieces were cut and treated with 8% active Dithane M-45 dust on April 10. Two replicates of 10 hills of each cultivar and breeding line were planted by hand on April 21. Each plot was paired with one of the Chippewa cultivar, which was planted by machine. The hand-planted seedpieces were spaced 12 inches apart in the row and the machine-planted ones nine inches apart. All rows were 34 inches apart. The 8-16-8 grade fertilizer was applied at the rate of 2250 pounds per acre as the rows were marked with the two-row potato planter on April 21. Foliar diseases and insects were controlled with weekly applications of recommended fungicides and insecticides. The plants were rotocut on September 1, and the tubers were harvested on September 8.

Forty tubers, or all tubers if less than 40 were available, from each plot were washed and examined for scab lesions. Each tuber was scored 0 (no lesions) to 4 (deep pits) for type of scab present, and 0 (no lesions) to 5 (61% or more) for surface area covered by scab lesions. These values were converted to individual tuber indices that ranged from 0 (no scab) to 140 (61% or more of the surface area covered by deep pitted scab). The scab index for each plot was calculated by dividing the sum of the individual tuber indices by the number of tubers examined. The index for each cultivar and breeding line was determined by calculating the average of the two plots. A scab index ratio was calculated for each cultivar and breeding line by dividing the cultivar or breeding line index by the average index of their respectively paired Chippewa plots and multiplying the quotient by 100. The ratios allow one to determine quickly which cultivars and breeding lines were more or less resistant to scab than Chippewa and to compare one cultivar or breeding line with another.

The results of the 1972 test (New York (Long Island) Table 1) suggest that Abnaki, Alamo, Norchip, Norgold Russet, Superior, Wauseon, NY-49, and H413-5 were highly resistant to scab. In 1971, Abnaki showed less resistance to scab than in 1972. Other cultivars and breeding lines that appeared to be more resistant to scab than Katahdin were Reliance, B6879-5, BR6316-7, NY-48, NY-51, F12-61, J99-5, and J249-17. Two breeding lines, NY-47 and J59-10, appeared to be more susceptible to scab than Chippewa. The other cultivars and breeding lines included in this test were in the Katahdin-Chippewa range of susceptibility.

Verticillium wilt. Eighty-seven cultivars and breeding lines were selected for evaluation for resistance to Verticillium wilt in 1972. The seedpieces were cut and treated with 8% active Dithane M-45 dust on April 12 and 13. On May 1, 35 cultivars and breeding lines were planted in single-row, 20-hill plots that were replicated four times; and 52 breeding lines were planted in 20-hill nonreplicated plots. The seedpieces were spaced 12 inches apart in the row,

and the rows were 34 inches apart. All cultural practices were those employed by the grower-cooperator in whose field these tests were conducted.

Observations on plant growth and vine condition were made periodically during the growing season. On August 14, the cultivars and breeding lines were rated for the condition of the vines. The system that was used was as follows:
1 = plants normal or nearly so, 2 = slight wilting and yellowing of the foliage, 3 = 60 to 90% of the foliage green, 4 = 40 to 60% of the foliage green, 5 = 20 to 40% of the foliage green, 6 = trace to 20% of the foliage green, and 7 = all plants dead. The tubers were harvested on September 15.

The tubers were sized on a grader equipped with 1.5- and 2-inch chains. All tubers that passed over the 1.5- and 2-inch chains were counted and weighed. All tubers that passed over the 2-inch chain were washed and examined for growth cracks and knobs. Forty tubers (2-inch minimum), or all tubers if less than 40 were available, from each plot were examined for pinkeye, stem-end vascular browning, hollow heart, and internal necrosis (nectoric rust, brown flecks, and small spots in the flesh). Stem-end vascular browning was scored in a cross-sectional plane 1/8 to 1/4 inch above the stem attachment as follows: 0 = no vascular browning, 1 = trace of vascular browning, 2 = 1 to 6% of the vascular ring brown, 3 = 6 to 12% of the vascular ring brown, 4 = 12 to 25% of the vascular ring brown, 5 = 25 to 50% of the vascular ring brown, and 6 = 50% or more of the vascular ring brown. A stem-end vascular browning score was calculated for each cultivar and breeding line by dividing the sum of the individual tuber scores by the number of affected tubers. A potato hydrometer was used to measure the specific gravity of an 8-pound sample of tubers from each plot.

The vine-score yield, specific gravity, and stem-end vascular browning data from the replicated trial were subjected to the analysis of variance. Percentages were transformed to equivalent angles, and the transformed data were analyzed. Duncan's multiple range test was used to determine significant differences among means. The small letters in the tables indicate groups of cultivars and breeding lines that do not differ significantly at the 5% level.

Circumstances beyond our control made it necessary to conduct these tests at a new location in 1972. The new site was selected based upon the past history that was provided by the new grower-cooperator. Assays of soil and potato root samples in July 1972 showed that the light Sassafras loam soil was infested with the root-lesion nematode, Pratylenchus penetrans. Typical symptoms of Verticillium wilt, however, failed to develop in known susceptible cultivars either because the population of Verticillium dahliae and/or V. albo-atrum was very low in the soil, or because the adverse effects of the abnormal growing season (5.64 and 11.33 inches of rain in May and June, respectively, followed by 1.20 inches in July and 1.37 inches in August) masked and/or inhibited the development of Verticillium wilt symptoms. As the result of the quick change from excessively wet to dry soil conditions and from cloudy, cool, moist to bright, dry atmospheric conditions in mid-July, many cultivars and breeding lines, especially the early maturing ones, died prematurely. Consequently, the yield of tubers was much below normal for all cultivars and breeding lines. The specific gravity of the tubers, however, was higher than normal. The results (New York (Long Island) Tables 2-5) probably are a measure of the response of the cultivars and breeding lines to the adverse growing conditions rather than a measure of their reaction to the Verticillium root-lesion nematode complex.

This work was conducted in cooperation with Dr. H. D. Thurston and Dr. R. L. Plaisted, Departments of Plant Pathology and Plant Breeding, respectively, Cornell University, Ithaca, New York; Dr. R. E. Webb, United States Department of Agriculture, Agricultural Research Service, Northeastern Region, Agricultural Research Center, Beltsville, Maryland; and Mr. Halsey Reeve, Riverhead, New York.

Variety or line	Scab index		Ratio- 1/-	Type of scab on affected tubers		Percentage of tubers with scab			
	Chipp- ewa			Average lesions		tubers with scab			
	Line	ewa		Line	Chippewa	Line	Chippewa		
Abnaki	1.8	41.6	4.2	2	3 - 4	2.1	3.6	40	82
Alamo	1.0	19.9	4.8	2	3 - 4	2.2	3.3	16	79
Cascade	2.5	12.0	21.0	2	3 - 4	2.0	3.1	31	71
Cascade M	6.4	32.4	19.8	2 - 4	3 - 4	2.6	3.4	51	86
Katahdin	3.0	13.1	22.6	2 - 3	2 - 4	2.4	3.2	49	72
Katahdin	4.8	21.0	22.7	2 - 3	3 - 4	2.4	3.2	74	86
Norchip	0.6	15.2	3.6	2	2 - 4	2.1	3.0	16	74
Norgold Russet	0.2	21.5	0.8	2	3 - 4	2.0	3.2	4	84
Peconic	9.6	10.9	87.4	2 - 4	2 - 4	3.0	3.2	69	71
Raritan	6.0	34.8	17.1	2 - 4	3 - 4	2.2	3.4	71	96
Reliance	1.3	10.5	12.5	2	2 - 4	2.0	3.2	31	64
Superior	0.4	19.0	2.4	2	2 - 4	2.2	3.1	11	86
Wauseon	0.2	16.8	1.3	2	2 - 4	2.2	3.0	5	71
B6376-6	7.6	29.6	25.8	2 - 4	3 - 4	2.8	3.4	64	90
B6741-11	3.6	22.2	16.4	2	2 - 4	2.2	3.4	60	76
B6741-23	2.1	15.0	14.1	2	2 - 4	2.2	3.2	35	78
B6879-5	2.2	22.7	9.7	2 - 3	2 - 4	2.2	3.2	28	92
BR6316-7	2.1	22.8	9.3	2	3 - 4	2.0	3.2	55	84
BR6820-29	2.2	11.0	19.6	2	2 - 4	2.1	3.2	58	55
NY-41	12.5	25.8	48.4	2 - 3	3 - 4	2.6	3.6	86	82
NY-45	3.6	16.7	21.9	2 - 4	3 - 4	2.6	3.4	40	75
NY-47	14.3	8.2	174.1	3 - 4	2 - 4	3.0	2.7	77	75
NY-48	1.2	15.0	8.2	2	2 - 4	2.0	3.2	28	71
NY-49	1.0	28.2	3.7	2	3 - 4	2.0	3.4	24	82
NY-51	1.9	14.3	13.3	2 - 4	2 - 4	2.7	3.0	22	78
F12-61	2.0	16.2	12.5	2 - 3	3 - 4	2.0	3.2	55	88
F293-10	5.0	23.4	21.2	2 - 3	3 - 4	2.3	3.4	58	92
G92-6	7.5	28.7	26.1	3 - 4	3 - 4	2.8	3.4	71	94
H213-7	11.1	35.2	31.5	2 - 4	3 - 4	2.7	3.5	65	95
H413-2	5.7	15.3	37.5	2 - 3	3 - 4	2.8	3.2	69	79
H413-5	0.3	20.0	1.5	2	3 - 4	2.0	3.3	12	81
J59-10	17.9	8.8	204.3	3 - 4	3 - 4	3.2	3.0	79	51
J99-5	2.4	19.3	12.6	2 - 3	3 - 4	2.1	3.4	50	84
J157-2	7.4	17.8	41.4	2 - 4	2 - 4	3.0	3.4	64	88
J249-17	1.6	18.7	8.8	2	3 - 4	2.0	3.2	41	80
6-HS-9	6.0	14.8	40.1	2 - 4	3 - 4	2.6	3.0	52	76

1/- Index for variety or line divided by index for paired Chippewa plots multiplied by 100.

New York (Long Island) Table 2. Percent stand, vine score, and yield of various varieties and breeding lines of potatoes grown in soils suspected to be infested with organisms associated with Verticillium wilt in 1972. (4 replicates, 20 hills, 12-inch spacing).

Variety or line	Percent stand 5/31	Vine score 8/14	Yield per acre		No. of tubers/hill	
			Total cwt	2-inch minimum Percent 1/	Total	2-inch minimum
Abnaki (1)	100	4.3 c-g	173 a	140 abc	67 c-g	5.4 a-d
Abnaki (2)	99	5.0 e-j	221 a-e	180 b-f	65 c-g	5.4 a-d
Cascade	99	3.5 a-d	295 e	246 f	62 b-f	7.3 efg
Cascade M	89	2.8 ab	281 e	230 ef	68 c-g	6.3 a-g
Peconic	100	5.0 e-j	221 a-e	174 a-f	65 c-g	6.7 b-g
Katahdin	99	4.0 c-f	227 a-e	184 b-f	67 c-g	7.0 d-g
Raritan	98	4.5 d-h	225 a-e	189 b-f	70 d-g	5.4 a-d
Reliance	100	5.5 g-k	229 a-e	199 b-f	72 d-g	5.5 a-e
Wauseon	96	5.0 e-j	179 ab	158 a-e	69 c-g	5.0 ab
B6376-6	98	6.3 jk	190 a-d	169 a-f	76 g	4.9 a
B6567-12	100	4.2 c-g	258 b-e	220 def	66 c-g	6.4 a-g
B6595-5	96	4.5 d-h	269 de	229 ef	70 d-g	7.1 d-g
B6741-11	98	5.3 f-k	188 a-d	148 a-d	62 b-f	5.2 abc
B6741-16	99	3.2 abc	186 abc	145 a-d	63 c-f	4.9 a
B6741-23	91	4.2 c-g	171 a	106 a	46 a	5.4 a-d
B6879-5	94	4.2 c-g	212 a-e	165 a-f	61 b-e	6.6 b-g
BR6316-7	96	3.5 a-d	268 de	208 c-f	60 b-e	8.1 g
BR6820-29	99	6.5 k	164 a	126 ab	59 bcd	5.4 a-d
NY-6	98	6.0 ijk	221 a-e	167 a-f	59 bcd	7.8 fg
NY-41	98	3.5 a-d	270 de	213 c-f	75 fg	6.3 a-g
NY-47	100	2.5 a	254 be	230 e-f	67 c-g	8.0 g
NY-49	100	4.8 e-i	232 a-e	168 a-f	56 abc	6.8 c-g
NY-51	99	3.5 a-d	197 a-d	130 ab	50 ab	6.7 b-g
F293-10	99	5.8 h-k	167 a	140 abc	72 d-g	5.0 ab
G92-6	99	4.8 e-i	223 a-e	178 b-f	64 c-g	7.0 d-g
H413-2	100	3.2 abc	267 cde	236 ef	70 d-g	4.4 c-h
H413-5	96	3.8 b-e	266 cde	237 ef	71 d-g	5.0 e-h
J99-5	100	2.8 ab	221 a-e	181 b-f	68 c-g	5.3 gh
J249-17	96	2.8 ab	263 cd	216 c-f	68 c-g	4.1 b-h
J370-32/	98	4.2	275	234	72	5.1 fgh
6-HS-92/	98	4.0	258	208	68	5.4
						4.6

1/ Based on number of tubers.

2/ Two replications of each line, data not included in statistical analyses.

New York (Long Island) Table 3. Specific gravity and percentage of tubers with various defects when varieties and breeding lines of potatoes were grown in soils suspected to be infested with organisms associated with Verticillium wilt in 1972.
(4 replicates, 20 hills, 12-inch spacing).

Variety or line	Specific gravity ^{1/}	Pink eye	Stem-end browning ^{2/}	Internal necrosis	Hollow heart	Growth cracks	Knobs
			%	Score			
Abnaki (1)	79 c-g	0.0	4 a	0.9 a	0.6	2.4	0.4
Abnaki (2)	82 f-j	0.0	9 a-d	1.3 a-d	0.0	0.6	0.0
Cascade	82 f-j	0.0	24 d-h	1.8 b-g	0.0	0.8	1.4
Cascade M	85 h-k	0.6	48 jk	2.2 e-h	0.0	0.3	4.4
Peconic	87 j-k	0.0	12 a-f	1.6 a-f	0.0	1.7	0.0
Katahdin	79 c-g	0.0	41 h-k	1.6 a-f	0.0	0.5	0.0
Raritan	98 m	0.0	33 g-k	1.7 b-g	1.9	1.0	0.4
Reliance	72 ab	0.6	26 e-j	1.5 a-e	0.0	5.7	1.3
Wauseon	77 b-f	0.0	42 h-k	2.2 e-h	0.0	1.5	0.4
B6376-6	81 e-i	0.0	7 abc	1.8 b-g	0.6	7.2	0.4
B6567-12	80 d-h	0.0	31 f-k	2.2 e-h	0.6	3.1	0.5
B6595-5	95 lm	0.0	24 d-h	1.6 a-f	0.0	1.0	0.3
B6741-11	78 cf	0.0	25 d-i	2.0 c-h	2.5	3.9	3.5
B6741-16	75 a-d	0.6	52 k	2.4 fgh	0.0	0.0	0.8
B6741-23	76 b-e	0.0	46 ijk	2.3 e-h	0.0	0.5	1.6
B6879-5	84 g-k	0.0	34 g-k	1.8 b-g	1.2	1.3	0.3
BR6316-7	88 k	0.0	52 k	2.3 e-h	1.2	1.9	2.2
BR6820-29	71 a	0.0	6 ab	1.0 ab	0.6	0.4	0.4
NY-6	72 ab	0.0	15 b-g	1.7 b-g	0.0	10.4	0.8
NY-41	87 jk	0.0	26 e-j	1.8 b-g	0.0	0.6	0.0
NY-47	90 kl	0.0	15 b-g	1.2 abc	0.0	0.3	0.0
NY-49	86 ijk	0.0	4 a	1.6 a-f	10.0	0.3	0.0
NY-51	75 a-d	0.0	26 e-j	2.8 h	0.6	4.8	1.1
F293-10	72 ab	0.0	11 a-e	1.6 a-f	0.6	6.5	0.7
G92-6	74 abc	0.0	30 f-k	2.6 gh	0.0	0.0	0.3
H413-2	85 h-k	0.0	40 h-k	2.1 d-h	0.0	1.8	0.0
H413-5	79 c-g	0.0	13 a-f	1.5 a-e	0.0	0.5	0.7
J99-5	82 f-j	0.0	50 k	2.0 c-h	0.0	0.0	1.2
J249-17	79 c-g	0.0	21 c-h	1.6 a-f	0.0	0.3	0.0
J370-33/	90	0.0	39	1.5	0.0	0.0	0.0
6-HS-93/	84	0.0	27	2.2	0.0	2.2	0.0

1/ 1.0 omitted from all specific gravity readings.

2/ Average score of affected tubers.

3/ Two replications of each line, data not included in statistical analyses.

New York (Long Island) Table 4. Percent stand, vine score and yield of breeding lines of potatoes grown in soils suspected to be infested with organisms associated with Verticillium wilt in 1972. (Nonreplicated, 20 hills, 12-inch spacing).

Breeding line	Percent stand 5/31	Vine score 8/14	Yield per acre		No. of tubers/hill	
			Total cwt	2-inch minimum Percent	Total	2-inch minimum
USDA-2511	100	6	161	77	4.4	3.4
F12-61	95	5	180	71	5.2	3.7
F21-14	100	3	311	68	7.6	5.2
H213-7	100	2	208	69	5.8	4.0
J59-10	100	6	284	83	6.0	5.0
J157-2	100	2	223	78	5.3	4.1
J333-2	100	6	234	79	5.2	4.9
K21-1	90	6	211	72	6.1	4.4
K21-15	100	5	288	71	7.2	5.1
K21-41	100	2	215	65	5.6	3.6
K21-45	100	3	196	65	5.0	3.3
K36-17	100	2	242	64	7.1	4.6
K37-1	95	4	258	67	7.7	5.2
K37-12	95	5	181	75	4.8	3.6
K38-22	100	4	338	80	5.3	4.2
K42-11	100	3	234	74	5.7	4.2
K56-7	75	3	258	67	9.4	6.3
K59-7	85	3	208	69	6.6	4.6
K59-55	100	5	238	49	7.6	3.7
K59-63	90	3	227	66	6.6	4.4
K60-20	95	3	211	71	5.5	3.9
K60-30	95	4	265	76	6.3	4.7
K60-52	100	3	211	68	5.4	3.6
K81-10	95	3	292	66	7.7	5.1
K290-6	95	3	192	63	5.6	3.5
K292-6	100	4	292	72	6.6	4.8
K297-3	100	4	292	60	8.3	5.0
K313-10	95	4	273	70	7.5	5.3
K341-10	100	2	296	85	7.2	6.1

(New York (Long Island) Table 4 continued on next page)

New York (Long Island) Table 4 (concluded).

Breeding line	Percent stand 5/31	Vine score 8/14	Yield per acre			No. of tubers/hill	
			Total cwt	2-inch minimum		Total	2-inch minimum
				Cwt	Percent ^{1/}		
K357-16	100	4	288	273	80	7.1	5.8
K460-1	100	6	258	215	69	6.7	4.6
K557-1	100	4	234	177	60	7.4	4.4
K562-5	95	3	338	304	76	8.0	6.1
K565-5	100	5	215	169	63	6.6	4.2
K565-16	100	3	254	215	71	6.6	4.8
K567-18	100	2	238	208	73	6.0	4.4
K586-3	95	3	288	258	74	6.9	5.1
K635-15	100	3	292	261	76	6.2	4.8
K653-1	100	4	227	196	72	6.0	4.3
K653-12	100	3	242	223	81	5.2	4.2
K653-16	100	4	215	196	79	4.8	3.8
B6138-3	100	5	184	154	72	5.5	4.0
B6603-6	100	3	238	215	77	5.2	4.0
B6712-9	85	3	169	138	71	4.7	3.1
B6747-5	95	2	304	261	73	7.8	5.7
B6750-7	95	3	284	254	73	5.8	4.3
B6761-12	100	5	177	111	46	6.4	3.0
B6775-4	95	2	261	219	71	6.7	4.8
B6934-12	100	5	292	250	70	6.9	4.8
B6987-29	100	4	238	208	75	6.4	4.8
B6987-37	100	3	219	188	74	5.4	4.0
B6987-43	100	4	246	234	84	4.0	3.4

^{1/} Based on number of tubers.

New York (Long Island) Table 5. Specific gravity and percentage of tubers with various defects when breeding lines of potatoes were grown in soils suspected to be infested with organisms associated with Verticillium wilt in 1972.
(Nonreplicated, 20 hills, 12-inch spacing).

Breeding line	Specific gravity ₁ /	Pink eye	Stem-end browning %	Score ₂ /	Internal necrosis	Hollow heart	Growth cracks	Knobs
USDA-2511	83	0.0	25	1.4	0.0	0.0	0.0	0.0
F12-61	95	0.0	2	3.0	0.0	0.0	0.0	0.0
F21-14	85	0.0	18	2.2	0.0	0.0	0.0	0.0
H213-7	82	0.0	20	1.0	2.5	0.0	0.0	0.0
J59-10	71	0.0	12	1.4	0.0	0.0	0.0	0.0
J157-2	76	0.0	60	2.4	0.0	0.0	0.0	0.0
J333-2	68	0.0	25	1.8	0.0	0.0	0.0	0.0
K21-1	78	0.0	0	-	0.0	5.0	12.6	0.0
K21-15	83	0.0	48	2.6	0.0	0.0	1.0	0.0
K21-41	75	0.0	30	2.4	0.0	2.5	0.0	0.0
K21-45	83	0.0	40	2.0	0.0	0.0	3.0	1.5
K36-17	79	0.0	35	1.8	0.0	0.0	0.0	2.2
K37-1	79	0.0	32	1.6	0.0	0.0	21.4	3.1
K37-12	81	0.0	8	1.0	0.0	0.0	10.3	0.0
K38-22	66	0.0	50	1.6	0.0	0.0	7.1	0.0
L42-11	81	0.0	35	2.0	0.0	0.0	0.0	0.0
K56-7	75	0.0	35	1.1	0.0	0.0	1.1	1.1
K59-7	74	0.0	60	1.9	0.0	0.0	1.3	0.0
K59-55	73	0.0	22	2.0	0.0	0.0	1.3	0.0
K59-63	78	0.0	48	1.5	0.0	0.0	0.0	0.0
K60-20	76	0.0	30	1.3	5.0	0.0	1.3	1.3
K60-30	89	0.0	28	1.4	0.0	0.0	1.1	0.0
K60-52	76	0.0	5	1.0	0.0	2.5	2.7	0.0
K81-10	75	0.0	30	1.7	0.0	0.0	0.0	0.0
K290-6	93	0.0	58	3.2	0.0	0.0	4.5	0.0
K292-6	86	0.0	70	1.9	2.5	0.0	1.0	0.0
K297-3	88	0.0	5	2.0	0.0	0.0	0.0	0.0
K313-10	84	0.0	22	1.4	0.0	0.0	0.0	0.0

(New York (Long Island) Table 5 continued on next page)

New York (Long Island) Table 5 (concluded).

Breeding line	Specific gravity ¹ / ₁	Pink eye	Stem-end browning %	Score ² / ₂	Internal necrosis	Hollow heart	Growth cracks	Knobs
K341-10	78	5.0	75	2.6	2.5	0.0	0.0	0.8
K357-16	80	0.0	5	1.0	0.0	0.0	0.9	0.0
K460-1	79	0.0	35	1.8	0.0	0.0	2.2	0.0
K557-1	86	0.0	88	3.2	0.0	0.0	2.2	0.0
K562-5	75	0.0	32	1.4	0.0	0.0	4.3	1.7
K565-5	85	0.0	0	-	0.0	0.0	1.2	0.0
K565-16	84	0.0	2	1.0	0.0	0.0	0.0	0.0
K567-18	86	0.0	20	1.9	0.0	0.0	23.0	0.0
K586-3	74	0.0	18	1.1	0.0	0.0	15.5	2.1
K635-15	75	0.0	80	2.3	0.0	0.0	1.0	0.0
K653-1	84	0.0	38	2.0	0.0	0.0	3.5	1.2
K653-12	83	0.0	50	1.6	2.5	0.0	0.0	0.0
K653-16	85	0.0	32	2.1	0.0	0.0	1.3	0.0
B6138-3	95	0.0	32	1.5	0.0	0.0	3.8	0.0
B6603-6	93	0.0	50	2.4	0.0	0.0	6.2	0.0
B6712-9	84	0.0	45	2.2	2.5	7.5	11.3	0.0
B6747-5	82	0.0	40	1.7	0.0	0.0	9.3	4.6
B6750-7	97	0.0	92	3.4	2.5	0.0	1.2	0.0
B6761-12	72	0.0	30	1.9	0.0	0.0	1.7	0.0
B6775-4	83	0.0	68	2.7	0.0	0.0	5.5	9.9
B6934-12	71	5.0	70	2.0	0.0	0.0	16.5	8.2
B6987-29	85	0.0	48	1.5	0.0	2.5	1.0	0.0
B6987-37	90	0.0	90	2.4	2.5	20.0	0.0	1.3
B6987-43	84	0.0	48	1.5	0.0	0.0	31.0	0.0

¹/ 1.0 omitted from all specific gravity readings.

²/ Average score of affected tubers.

NEW YORK (LONG ISLAND)

S. Dallyn, P. Schippers and D. Fricke

Potato Variety Trial - 1972

Methods. Seed hand cut, April 4, 33 pieces per replication, 6 replications. April 19, planted with assist-feed planter, spacing approximately 9", 2250 lbs/A 8-16-8 banded. Two Norland seedpieces dropped between each plot as markers, plots 30' long by one row wide; rows 34" apart.

Stand counts taken May 30, June 5, June 13. Maturity ratings on vines made July 25, August 1, 9, 16, 23. Vines killed August 26, harvested September 14.

Storage. Samples were cured at 15-20° C to October 10 then placed in storage. Specific gravities were determined October 10 by weighing approximately 5 kg of tubers in air and in water. All determinations, except specific gravity, were done with the same tubers. November subsamples consisted of 25 tubers, the January samples of 10.

Chipping. Samples from 10° C storage were chipped November 16 and from 7.5, 10, and 12.5° C storage on January 10. Color was measured with an Agtron Color Meter with reference disks 05 and 56. Samples with color scores below 55 were considered unsatisfactory.

Black Spot. A 100 gram metal plug was dropped from a height of 30 cm onto the stem end of tubers at a temperature of 10° C. Intensity and size of the black spot was rated on a scale of 0 = no black spot to 5 = very severe. The scores were totaled and divided by the number of tubers involved. The January values are averages of the three temperatures involved since this factor did not influence susceptibility.

Cooking Quality. (11/16 10° C). Ten tubers were cut in half from stem to bud end and one half of each boiled. Color was rated immediately: 1 = white, 3 = light yellow, 5 = deep yellow. Ten minutes later they were rated for discoloration: 1 = none, 3 = moderate, 5 = severe. Mealiness of the mashed tubers was judged by their appearance of fluffiness and texture (mostly dryness) when tasted: 1 = soggy, 3 = fairly mealy, 5 = very mealy.

Sprouting.

- 0 = an occasional tuber with activity in one or more eyes.
- 1 = eye activity in at least 80% of the tubers.
- 2 = 80% or more tubers with sprouts 1-2 mm in length.
- 3 = 80% or more tubers with sprouts approximately 5 mm in length.
- 4 = 80% or more tubers with sprouts approximately 10 mm in length.
- 5 = 80% or more tubers with sprouts longer than 10 mm.

"many" = many eyes in tuber showing activity.

"bushy" = many sprouts from one eye, often branched.

"necrotic tips" = tips of several sprouts black and probably dead;
often followed by multiple branching.

New York Table 1. Long Island Vegetable Research Farm, Riverhead, New York, potato variety trial--1972

Variety-Source	2 to 3-1/2" "B" Outs	Pick	% Jumbo Hollow Heart		Appear--1/ ance Rating		Stand ² / 5/30 6/5		Date Vines 50% Dead		Specific Gravity 10/10		% Dry Matter 11/16		Blackspot ³ / 11/16 1/10	
			Jumbo	Hollow Heart	Rating	Stand ² / 5/30 6/5	Date Vines 50% Dead	Specific Gravity 10/10	% Dry Matter 11/16	Blackspot ³ / 11/16 1/10	Specific Gravity 10/10	% Dry Matter 11/16	Blackspot ³ / 11/16 1/10	Specific Gravity 10/10	% Dry Matter 11/16	Blackspot ³ / 11/16 1/10
J249-17 - Cornell	378	22	0	5	3.3	25	8/23	1.0663	19.0	1.40	0.23	19.0	1.40	0.23	19.0	1.40
NY41 (Hudson) - Cornell	340	17	2	31	3.6	25	8/12	777	20.7	2.17	1.67	20.7	2.17	1.67	20.7	2.17
BR6316-7 - USDA, Me.	337	29	4	1	3.5	26	8/30	789	20.8	1.14	0.80	20.8	1.14	0.80	20.8	1.14
Cascade - USDA, Me.	303	41	3	4	3.8	23	8/22	739	19.7	0.80	0.70	19.7	0.80	0.70	19.7	0.80
B6567-12 - USDA, Me.	292	15	2	7	3.5	21	8/23	706	19.4	1.10	0.11	19.4	1.10	0.11	19.4	1.10
B6595-5 - USDA, Me.	279	23	4	30	3.6	20	8/12	796	21.2	1.57	1.80	21.2	1.57	1.80	21.2	1.57
B7151-9 - USDA, Me.	271	13	3	4	3.7	27	8/9	789	20.8	1.97	1.87	20.8	1.97	1.87	20.8	1.97
B7151-7 - USDA, Me.	264	36	5	0	3.5	27	8/7	843	21.5	1.64	1.03	21.5	1.64	1.03	21.5	1.64
B6879-5 USDA, Me.	247	29	3	5	3.7	23	8/16	713	19.1	1.97	0.80	19.1	1.97	0.80	19.1	1.97
Raritan - USDA, Me.	245	15	5	9	3.6	26	8/26	862	23.4	1.33	0.14	23.4	1.33	0.14	23.4	1.33
NY46 - Cornell	233	32	2	2	3.6	26	8/12	743	19.3	2.27	2.37	19.3	2.27	2.37	19.3	2.27
B5141-6 - USDA, Me.	231	21	1	0	3.3	25	8/23	910	23.8	2.44	2.50	23.8	2.44	2.50	23.8	2.44
B6987-29 - USDA, Me.	231	10	19	4	2.7	26	8/1	713	20.3	1.44	1.20	20.3	1.44	1.20	20.3	1.44
Reliance - USDA, Me.	226	20	1	3	3.7	23	8/1	574	16.3	0.97	0.20	16.3	0.97	0.20	16.3	0.97
Wauseon - USDA, Me.	226	15	5	2	3.4	26	8/8	634	17.0	1.24	0.80	17.0	1.24	0.80	17.0	1.24
B6376-6 - USDA, Me.	223	17	7	0	3.5	26	8/1	724	19.2	1.63	0.87	19.2	1.63	0.87	19.2	1.63
Katahdin - Thibreau, Me.	210	21	1	1	3.8	25	8/6	681	18.6	2.04	1.43	18.6	2.04	1.43	18.6	2.04
J59-10 - Cornell	209	18	0	0	3.4	24	7/22	591	15.8	1.70	1.83	15.8	1.70	1.83	15.8	1.70
B6545-7 - USDA, Me.	208	67	5	0	3.8	22	8/5	658	17.7	0.97	0.37	17.7	0.97	0.37	17.7	0.97
B6741-23 - USDA, Me.	208	32	0	1	4.2	22	8/12	695	19.2	1.27	0.97	19.2	1.27	0.97	19.2	1.27
B6741-16 - USDA, Me.	202	13	0	0	3.7	26	8/5	686	19.2	1.73	-	19.2	1.73	-	19.2	1.73
B6987-43 - USDA, Me.	198	5	14	18	3.2	22	8/12	704	19.9	1.50	1.67	19.9	1.50	1.67	19.9	1.50
Alamo - USDA, Me.	197	39	2	5	3.7	23	8/4	623	16.6	1.33	0.53	16.6	1.33	0.53	16.6	1.33
Abnaki - Bradstreet, Me.	196	30	2	1	3.7	23	8/1	750	19.6	0.67	0.90	19.6	0.67	0.90	19.6	0.67
Cariboo - USDA, Me.	195	51	2	0	3.3	29	8/12	803	20.9	1.87	2.10	20.9	1.87	2.10	20.9	1.87
Superior - Staples, Me.	191	17	4	2	3.4	24	7/26	708	18.3	2.34	2.53	18.3	2.34	2.53	18.3	2.34
J333-2 - Cornell	190	9	1	1	3.9	23	7/28	569	16.3	0.87	0.30	16.3	0.87	0.30	16.3	0.87
BR6820-29 - USDA, Me.	189	38	0	0	3.5	25	8/1	632	16.7	1.60	0.83	16.7	1.60	0.83	16.7	1.60
Katahdin - Cornell	175	12	1	3	3.6	26	8/1	676	18.2	1.40	1.07	18.2	1.40	1.07	18.2	1.40
B6741-11 - USDA, Me.	169	21	2	0	3.7	19	8/9	670	18.2	1.50	1.03	18.2	1.50	1.03	18.2	1.50
Norgold Russet - Burbridge, N.D.	163	57	4	0	3.6	25	7/28	672	18.6	1.26	1.20	18.6	1.26	1.20	18.6	1.26
Chippewa - Findlen, Me.	160	11	5	12	3.4	20	8/16	616	17.0	1.63	0.87	17.0	1.63	0.87	17.0	1.63
Russet Burbank - Thibreau, Me.	150	58	22	0	3.6	25	8/20	779	21.0	2.00	1.83	21.0	2.00	1.83	21.0	2.00

New York Table 1. (Continued)

Variety-Source	2 to 3-1/2"	"B"	Pick Outs	% Jumbo		Appear- ance Rating	Stand ^{2/}		Date Vines 50% Dead	Specific Gravity 10/10	% Dry Matter		Blackspot ^{3/}	
				Jumbo	Hollow Heart		5/30	6/5			11/16	11/16	11/16	1/10
Alamo - Albair, Me.	147	47	4	0	0	3.5	25	31	8/1	609	16.7	1.20	0.77	
Alamo - Smith Packing, Me.	127	46	2	0	0	3.4	23	30	7/22	580	16.2	0.63	0.57	
Norgold Russet - Malcolm & Mahan, Me.	125	59	4	0	0	3.5	23	29	7/28	699	19.0	1.93	1.50	
Norchip - Burbidge, N. D.	122	44	15	0	0	2.8	26	30	8/1	741	19.4	2.37	1.20	
LSD, 5%	38													

1/ 1 = poor; 5 = excellent2/ Plants per plot, 33 seedpieces planted3/ 0 = none; 5 = severe

New York Table 2. Long Island Vegetable Research Farm, Riverhead, New York, potato variety trial--1972

Variety	Chip Color ¹ /			Cooking Quality		Sprouting ⁵ /		Sprouting ⁶ /		
	11/16	1/10	1/10	Color ² /	Discol. ³ /	Mealiness ⁴ /	11/16	1/10/73 ⁶ /		
	10°C	7.5°C	10°C					7.5°C	10°C	12.5°C
J249-17	24	19	23	2	1	2	-	-	1	1-2
NY41 (Hudson)	46	22	38	2-3	1-2	4-5*	-	0	0?	1-2
BR6316-7	56	32	46	1-2	1-2	4	2-3m	3-4m	3-4m	4-5
Cascade	58	18	42	2	1	3-4*	-	-	1	3-4
B6567-12	52	32	35	2-3	1	3	2-3	4-5b	4-5b	4b
B6595-5	64	44	63	2	2-3	3-4	2	2	2	4bn
B7151-9	68	56	65	2	1-2	3-4	0-1	2	2	3
B7151-7	65	40	59	2	3	4*	2	2-3	2-3	4bn
B6879-5	51	21	44	2	1	3	0-1	1-2	1-2	2
Raritan	62	40	49	1-2	3	5*	1-2	2	3-4	5n
NY46	58	42	58	2-3	1-2	2-3	0-1	0-1	1-2	2
B5141-6	70	60	64	2	3-4	4-5	2	3	2m	4-5bn
B6987-29	63	42	64	2	1-2	4*	1	1	2-3	4-5bn
Reliance	36	13	29	2	1	2	0-1	0-1	1	2-3
Wauseon	57	15	38	2	1	2	0?	1-2	3m	4
B6376-6	56	38	49	2-3	2	3	-	-	1m	1-2m
Katahdin	53	24	50	2-3	1	2-3	-	-	1-2	2-3
J59-10	45	34	50	2	1-2	2	-	0-1	1	3-4n
B6545-7	30	16	28	2	1	1-2	-	1	1-2	2-3
B6741-23	57	26	47	2-3	1	2	-	-	0-1	1
B6741-16	42	-	-	2-3	2	3	0?	-	-	-
B6987-43	61	38	52	1-2	2-3	2	1	1	2	4n
Alamo	38	19	38	2	1	2	0-1	0-1	1	2m
Abnaki	64	37	57	2-3	1	3	-	1	1-2	4
Cariboo	65	60	58	2	2	3	3-4	3-4	3-4	4-5n
Superior	55	34	55	2-3	1-2	3*	1	1	2	2-3
J333-2	50	30	41	2-3	1	2	-	-	0-1	1
BR6820-29	58	35	55	2	1	2	1-2	1-2	2-3	4
Katahdin (NY)	58	35	49	2-3	1-2	3	-	-	1	2-3
B6741-11	60	38	60	3	2	3	1	1	1m	1m
Norgold Russet	41	28	29	2	2	2-3	2	2	2-3m	-
Chippewa	53	35	61	3	1	2-3	1	1	2-3	4-5bn
Russet Burbank	53	36	36	2-3	1	3-4*	-	-	0-1	1

New York Table 2. (Continued)

Variety	Chip Color ^{1/}					Cooking Quality		Sprouting ^{5/} 11/16 10°C	Sprouting ^{5/} 1/10/736/ 7.5°C 10°C 12.5°C		
	11/16 10°C	1/10 7.5°C	1/10 10°C	1/10 12.5°C	1/10 12.5°C						
						Color ^{2/} Discol. ^{3/}	Mealiness ^{4/}				
Alamo (Albair)	31	24	32	52	52	2-3	1	-	-	2	2
Alamo	38	27	38	48	48	2-3	1	-	-	1-2	2
Norgold Russet (Me.)	36	30	34	-	-	2	1-2	1-2	2	2-3m	-
Norchip	70	38	56	56	56	2-3	1	-	0-1	1	2

^{1/} Agron. Readings below 55 unsatisfactory

^{2/} 1 = white, 5 = deep yellow

^{3/} 1 = none, 5 = severe

^{4/} 1 = soggy, 5 = very mealy, * = some sloughing

^{5/} ? = occasional tuber sprouting

^{6/} See text; m = many, b = bushy, n = necrotic tips

New York Table 3. Long Island Vegetable Research Farm, Riverhead, New York,
potato variety trial--1972

Variety	Comments
J249-17	Round white, irregular, flattened
NY41 (Hudson)	Round white
BR6316-7	Slightly elongated white, skinning
Cascade	Elongated, bright white skin, some skinning
B6567-12	Round white, pink eyes
B6595-5	Round, heavy net
B7151-9	Elongated, slight net, shallow eye
B71 1-7	Round, moderate net
B6879-5	Round, slight net
Raritan	Slightly elongated, heavy net
NY46	Round white
B5141-6	Round, slightly flattened, some skinning
B6987-29	Flat irregular shape, growth cracks
Reliance	Round white, light net
Wauseon	Round irregular shape, slight net
B6376-6	Round white
Katahdin	Round white
J59-10	Round bright white
B6545-7	Elongated, bright white
B6741-23	Elongated, bright white, uniform, shallow eye
B6741-16	Elongated, bright white
B6987-43	Round, rough irregular, skinning, shatter bruise
Alamo	Slightly elongated white
Aunaki	Round white, slight net
Cariboo	Round white, red coloration around eyes
Superior	Round, flattened, white
J333-2	Round white, shallow eye
BR6320-29	Round, bright white
Katahdin (NY)	Round white
B6741-11	Elongated, some skinning
Norgold Russet	Elongated, medium net, uniform
Chippewa	Round, bright white
Russet Burbank	Elongated, heavy net, some knobs
Alamo (Albair)	Slightly elongated white, very shallow eye
Alamo	Slightly elongated white, very shallow eye
Norgold Russet (Me.)	Elongated, medium net, uniform
Norchip	Round white, irregular shape

Comments. Yields were well below normal due to adverse growing conditions. The following were considered among the more promising in the trial:
J249-17, Hudson, BR6316-7, Cascade, B7151-9 (early), B6879-5, NY46, Reliance (early), B6545-7, B6741-23 (very attractive).

NEW YORK

R. L. Plaisted and H. D. Thurston
In cooperation with
Anderson, Brodie, Cetas, Dallyn,
Ewing, Fricke, Harrison, Jones, Sieczka

The N. Y. breeding program in 1972 was directed toward (1) the regular selection and seed multiplication program, (2) the advancement of two andigena breeding populations, (3) a multiplication of NY-41, and (4) trials to measure heterosis in andigena x tuberosum hybrids.

In the regular selection program, about 15,000 seedlings of tuberosum were planted in the greenhouses. From 3990 seedling hills from tuberosum x tuberosum crosses, 539 selections were made. From 8154 seedling hills of tuberosum x andigena crosses, 628 selections were made. Two thousand unreplicated 10-foot observation plots produced 307 for further test. In the yield selection phase, 62 entries in the first stage produced 35 selections (Table 1); 46 entries in the second stage produced 21 selections (Table 2); and 4 entries in the third stage produced 2 selections (Table 3). All of these numbers will be reduced by chipping and cooking tests during the winter. Line NY-6 will not be continued.

In the andigena program, approximately 30,000 seedlings of open-pollinated fruits from selections representing 600 original accessions were planted in the greenhouses to become the first cycle of the new population. In the population now in its 5th cycle of selection, 6225 hills were planted and 415 selections made. In addition, 311 hills were saved from one family that in previous sampling proved to be valuable for late blight and root-knot resistance. These selections will be evaluated for late-blight resistance in the greenhouse, resistance to PVX, PVY, and root-knot nematodes, as well as for chipping quality and dormancy. The clones which prove to be resistant to late blight in the greenhouse test will be evaluated in Mexico during the summer. A preliminary screening of this population in 1972 identified 31 with fair to good resistance to late blight in Mexico and 42 resistant to root knot. A similar screening for aphid resistance did not produce any results encouraging further search at this time. Two years of evaluation of the parents of the present selections have identified 24 that appear to be resistant to PVY.

During the summer 5 seed growers produced a total of 6 acres of foundation seed of NY-41. In addition to replicated yield trials, 4 half-acre demonstration trials were planted on Long Island. On the basis of this experience as well as the accumulated information from past years (Tables 4-8), the decision has been made to release NY-41 as a variety. In 39 trials over a seven-year span, NY-41 has yielded 373 cwt/A compared with 269 for Katahdin. Even though NY-41 produces large tubers, only 2.5% of the jumbos in 9 trials have been hollow compared with 4.1% of the Katahdins. Specific gravity in 13 trials has measured .003 units better than Katahdin. In scab trials it has been only slightly more susceptible than Katahdin. In verticillium wilt trials it has been intermediate to Katahdin and Kennebec in vine score and percent pink eye, but less than Katahdin in stem-end browning. The total glycoalkaloids in 5 trials of NY-41 was 6.18 mg/100 g of fresh

wt. compared with 6.78 mg/100 g for Katahdin. Line NY-41 is resistant to race A of the golden nematode. It emerges from the ground and grows rapidly, producing a vigorous vine with large, flat leaves. The flower color is almost identical to Katahdin. The tubers are shaped similar to Katahdin, though they may be somewhat less regular and exhibit some scurviness under some growing conditions. It has not produced satisfactory chip color after storage, so it is intended for table stock use.

New York Table 1. First year yield trial - 1972. Four replications of 15-foot plots at Ithaca. Selections saved from 62 entries.

Pedigree Kat.(5x)	GN ^{1/} +	Chip 50 ^{2/}		Specific Gravity		Vert. Wilt ^{3/}		Yield cwt/A		% > 2-1/4	Appear ^{4/} 4.5	4/hht ^{5/} xl/16	Int. 6/ Necr. xl/16	Growth ^{7/} cracks	ACD ^{8/}	
		1970	1971	1971	1972	1971	1972	Total	> 1-7/8						1971	1972
L33-6	-	I	A-I	1.076	1.084	5	4	312	298	77	4.5	3.4	0.6		0	18
36-20	-	I	A	1.080	1.088	6	5	336	317	71	3.8	0	2	occ	1	47
36-26	-	U	A	1.078	1.084	5	4	307	272	66	3.5	1	5		3	
39-9	-		I	1.082	1.084	3	4	347	329	73	4.0	0	0		3	
58-3	-	U	I	1.074	1.090	5	6	334	292	62	4.0	1	2		1	2
66-14	-	A	I	1.080	1.081	7	6	381	364	82	3.0	0	1	occ	3	
66-15	-	U	A	1.083	1.081	7	7	333	311	71	4.8	0	1	2	2	1
66-24	-	I	A	1.081	1.074	7	7	321	305	81	4.0	2	0	occ, many	3	
68-2	-	I	A	1.081	1.075	6	7	307	283	66	3.5	0	0	occ	2	1
68-10	-	A	A	1.080	1.080	6	6	288	269	74	4.0	0	0	occ	3	2
71-9	-	U	I	1.083	1.090	4	4	334	319	83	3.0	3	0	occ	1	2
74-17	-		A	1.082	1.091	6	6	392	371	79	3.5	3	0	many	3	
78-14	-	U	A	1.075	1.088	5	5	299	278	77	3.2	0	0		2	1
78-20	-	U	I	1.079	1.090	3	5	317	283	73	3.8	4	4	occ, few	1	1
80-13	-	U	I	1.080	1.088	6	5	271	257	81	3.0	1	0	occ, few	3	
165-5	-	A	A	1.077	1.071	7	5	312	294	70	3.0	1	2	occ	1	1
176-23	-	U	A	1.088	1.089	6	6	310	282	70	2.8	2	0		3	
186-1	-	U	A	1.095	1.105	4	3	288	269	70	3.0	2	0		1	1
188-10	-	U	I	1.079	1.090	4	5	378	346	68	3.0	0	0	few ²	3	
197-4	-	U	I	1.074	1.089	6	6	345	318	73	3.2	1	1	deep ²		
197-11	-		I	1.080	1.081	5	5	311	286	65	4.2	3	3		3	
235-1	+	A	I	1.078	1.078		6	345	330	78	3.8	5	1	occ	1	2
241-3	-	A	A	1.093	1.094	7	5	282	258	65	4.2	0	2		2	2
262-3	-	I	I	1.094	1.093	4	5	296	275	70	3.2	2	0		3	
265-5	-	U	I	1.081	1.078	6	6	430	411	87	2.8	7	0	few ² , many	3	
287-13	-	U	A	1.080	1.089	4	5	381	365	87	3.2	1	0		3	
298-9	-	U	U	1.080	1.090	4	5	293	283	74	4.0	3	0	few, many	3	1
298-12	-	U	U	1.079	1.087	5	4	359	351	89	3.0	4	0		3	
521-5	-	U	U	1.076	1.082	3	4	404	378	81	3.0	2	0		3	
521-7	-	U	U	1.078	1.087	3	3	353	329	76	3.8	0	0		3	
529-20	-	A	U	1.079	1.085	5	3	325	304	79	4.2	2	0	occ ²	1	1
532-5	-	I	I	1.085	1.090	5	3	368	357	88	3.0	1	0	many ²	2	4
551-5	-	A	I	1.083	1.098	7	5	315	305	83	4.8	4	2	many ²	1	2
551-7	-	A	A	1.093	1.102	4	4	396	385	81	3.8	1	6	many ²	2	2
554-8	-	U	A	1.098	1.104	4	5	348	334	84	2.8	2	0		1	2
	-		A	1.090	1.096	4	4	293	272	77	3.0	4	0		1	2

Footnotes for all tables.

1/ Golden nematode resistance

2/ A = acceptable
I = intermediate
U = unsatisfactory

3/ 1 = no wilting
7 = severe wilting

4/ 1 = very rough
5 = very nice

5/ Hollow heart

6/ Internal necrosis

7/ Occasional, few, many

8/ Aftercooking darkening. 0 = none, 1 = gray, 2 = black

New York Table 2. Second year yield trial. Four replicates of 15-foot plots at Ithaca & Riverhead, 3 replicates of 20-foot plots at Cato. Selections from 46 entries.

Pedigree	GN	Chip				S.G.	V.W.		ACD	Yield in cwt/A				Loc.	Total				hht	Int. Necr.	Appear.	Gr. Cr.																																																																																																																																																																																																																																																																																																																																									
		1971		1970 50° 2 wk.	1971 50° 2 wk.		1972 5 wk.	1970 1971		1972	1970 1971 1972	1970 1971 1972	1970 1971 1972		1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972					1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970 1971 1972	1970

Chip

Pedigree	GN	1970		1971	S.G.	V.W.			ACD	Yield in cwt/A					hht	Int. Necr.	Appear.	Gr. Cr.	
		50°	6 wk.	50°		5 wk.	1970	1971		1972	Total	> 1-7/8	> 2-1/4	> 2-1/4					%
K60-30	-	A+	I	A	1.076	5	0 ¹ ₃ ¹	0 ¹ ₁ ²	0 ¹ ₁ ²	Ith	305	278	221	72	0	2/16	3.0		
					1.084	6	0 ³ ₁ ¹	0 ³ ₁ ¹	0 ³ ₁ ¹	Riv	284	259	174	61	0	0	3.8		
					1.089	5				Cato	182	145	62	34	0	0	4.3		
K292-6	-	U	A	A	1.088	7	1 ⁴ ₂ ²	0 ¹ ₁ ²	1 ⁴ ₂ ²	Ith	358	335	273	76	0	1/16	4.0		
					1.088	7	0 ¹ ₁ ²	0 ¹ ₁ ²	0 ¹ ₁ ²	Riv	294	230	136	46	0	0	4.2		
					1.100	6				Cato	271	227	139	51	0	0	4.7		
K297-3	-	U	A	A	1.077		1 ¹ ₄ ²	0 ¹ ₄ ²	1 ¹ ₄ ²	Ith	370	342	266	72	0	0	3.5		
					1.083	7	0 ¹ ₄ ²	0 ¹ ₄ ²	0 ¹ ₄ ²	Riv	381	329	219	57	0	0	4.3		
					1.084	6				Cato	219	170	85	39	1/12	0	3.7		
																	sev		
K313-10	-	U	I	I	1.081	5	1 ² ₂ ²	0 ¹ ₁ ²	1 ² ₂ ²	Ith	353	327	264	75	1/16	1/16	3.8		
					1.082	4	0 ¹ ₁ ²	0 ¹ ₁ ²	0 ¹ ₁ ²	Riv	266	224	121	45	0	0	4.3		
					1.081	5													
K349-7	-	A-	I	A	1.070	6	1 ⁴ ₄ ¹	0 ¹ ₄ ¹	1 ⁴ ₄ ¹	Ith	321	313	290	91	0	1/16	3.8		
					1.067	6	1 ⁴ ₄ ¹	0 ¹ ₄ ¹	1 ⁴ ₄ ¹	Riv	248	234	182	73	1/8	0	5.0		
					1.078														
K357-16	-	U	U	U	1.080	3	1 ¹ ₂ ²	0 ¹ ₁ ²	1 ¹ ₂ ²	Ith	342	334	312	91	0	0	2.5		
					1.083	4	0 ¹ ₁ ²	0 ¹ ₁ ²	0 ¹ ₁ ²	Riv	307	275	189	62	0	0	4.8		
					1.087														
K460-1	-	U	A	I	1.077	7	0 ³ ₁ ¹	0 ¹ ₂ ²	0 ³ ₁ ¹	Ith	391	367	312	80	0	1/16	3.5		
					1.079	6	0 ¹ ₂ ²	0 ¹ ₂ ²	0 ¹ ₂ ²	Riv	280	224	122	44	1/8	0	occ ² , sev		
					1.087					Cato	354	292	163	46	0	0	few, sev		
																	occ, few		
K527-9	-	I	I	A	1.073	7	1 ⁴ ₂ ²	0 ¹ ₁ ²	1 ⁴ ₂ ²	Ith	384	359	298	78	0	1/16	3.8		
					1.073	7	0 ¹ ₁ ²	0 ¹ ₁ ²	0 ¹ ₁ ²	Riv	340	311	206	61	0	0	3.3		
					1.081	7				Cato	369	314	208	56	0	1/12	4.0		
K562-5	-	U	A	A	1.075		0 ⁴ ₄ ¹	0 ⁴ ₄ ¹	0 ⁴ ₄ ¹	Ith	398	370	310	78	1/16	0	occ		
					1.080	6	0 ⁴ ₄ ¹	0 ⁴ ₄ ¹	0 ⁴ ₄ ¹	Riv	359	296	177	49	0	0	2.5		
					1.077	4				Cato	217	168	91	42	0	0	2.8		
																	3.0		
																	occ, few		

New York Table 2 continued.

Pedigree	GN	Chip		S.G.	V.W.		ACD	Yield in cwt/A					hht	Int.		Appear.	Gr. Cr.
		1970	1971		1970	1971		1972	Total	>1-7/8	>2-1/4	>2-1/4		%	Necr.		
K565-16	-	I	A	1.082	5	1 ⁴	1 ⁴	1 ⁴	312	292	242	78	0	1/16	2.5		
		I	I	1.097	3	1 ⁴	1 ⁴	1 ⁴	316	268	200	63	0	0	3.7		
				1.094	3												
K653-1	-	I	A	1.080	5	1 ³	1 ²	1 ³	332	307	252	76	1/16	0	3.8		
		I	I	1.081	5	1 ³	1 ²	1 ³	296	237	154	52	0	2/8	4.8		
				1.084	6												
K653-12	-	U	A	1.081	5	1 ⁴	1 ⁴	1 ⁴	319	298	243	76	0	0	4.5		
		I	I	1.080	4	1 ⁴	1 ⁴	1 ⁴	256	196	100	39	0	0	4.2		
				1.088	6												
USDA2511	-	I	I	1.082		0 ¹	1 ¹	0 ¹	352	346	299	85	0	0	3.8	occ ³	
		A	A	1.070		0	0	0	277	243	144	52	1/8	0	4.3		
				1.085	6				187	137	56	30	0	0	3.7	occ	

-134-

New York Table 3. Advanced yield trials. 1972. Ithaca and Riverhead - 6 replications of 20' plots.
Cato - 3 replications of 20' plots.

Pedigree	Loc.	cwt/A yield				%	S.G.	Appear.	hht	Int. Necr.	Notes
		Total	> 1-7/8"	> 2-1/4"	> 2-1/4"						
Katahdin	Ith 2x	308	290	246	80	1.080	3.8	9/48	0		occ gc
	Riv 2x	262	224	150	57		4.8	1/24	0		sev gc
	Cato	141	98	40	28		3.3	0	0		
Cascade	Ith	404	372	313	77	1.080	2.7	0	0		
NY-41 6"	Ith	424	401	352	83	1.085	3.5	1/24	1/24		occ gc
	Riv	429	395	342	80		4.3	2/12	0		(occ gc) ²
NY-41 9"	Ith	409	397	372	91	1.084	3.4	1/24	0		occ K
	Riv	424	389	341	80		4.5	0	0		(occ gc) ²
	Cato	230	204	153	67		4.3	0	0		
NY-46	Ith 2x	341	314	259	76	1.089	3.5	4/48	0		occ gc, few gc
	Riv	267	224	126	47		4.8	0	0		
	Cato	212	184	128	60		3.3	2/12	0		few gc ² , sev ¹ gc
J59-10	Ith	408	391	357	88	1.074	3.3	0	0		occ gc
	Riv	273	255	198	73		3.7	0	0		
J249-17	Ith	401	383	347	86	1.074	2.5	4/24	0		occ gc, few gc
	Riv	362	312	230	64		3.0	0	0		few gc
J333-2	Ith	302	288	264	87	1.072	2.3	3/24	0		(occ gc) ²
	Riv	212	152	137	65		4.7	0	0		(sev gc) ²
J370-3	Ith	338	304	243	72	1.080	3.2	0	0		occ gc, ³
	Riv	229	200	125	55		4.0	0	0		(sev gc) ³

-135-

New York Table 4. Yield of NY-41 in cwt/A.

	Total		> 1-7/8"		> 2-1/4"		% > 2-1/4"	
	NY-41	Kat.	NY-41	Kat.	NY-41	Kat.	NY-41	Kat.
<u>1966</u>								
Ithaca 10"	562	449			524	416	93	93
<u>1967</u>								
Riverhead 10"	422	231	396	212	364	168	86	73
Ithaca 10"	456	410			423	376	93	92
<u>1968</u>								
Riverhead 9"	698	453	647	434	600	379	86	84
Ithaca 10"	547	433	527	408	497	370	91	85
Wainscott 9"	487	310			429	234	88	75
<u>1969</u>								
Riverhead 9"	528	392	521	380	492	333	93	85
Ithaca 9"	433	376	410	360	370	327	85	87
12"	457	367	430	353	396	325	87	88
Wayland 9"	272	201	255	171	197	109	73	54
12"	211	153	171	135	129	95	61	62
Cato 9"	225	165	204	139	172	99	77	61
12"	248	208	228	180	194	142	78	68
<u>1970</u>								
Riverhead 9"	438	369	415	352	384	288	88	80
12"	457	300	438	286	408	244	89	82
Freeville 9"	475	404	467	369				
Riverhead 12"	294	282	274	258				
v.w. soil								
<u>1971</u>								
Ithaca 6"	404		384		359		89	
9"	386	340	354	326	330	301	85	89
Riverhead 6"	391		380		327		84	
9"	382	305	378	296	334	248	87	81
Cato 9"	263	226	242	213	195	164	74	73
<u>1972</u>								
Ithaca 6"	424		401		352		83	
10"	409	308	397	290	372	246	91	80
Riverhead 6"	429		395		342		80	
9"	424	262	389	224	341	150	80	57
Cato 9"	230	141	204	98	153	40	67	28
L.I. #1	445	346	399	322	355	271	80	78
2	341	216	320	175	273	122	80	56
3	524	340	506	313	449	254	86	75
4	462	258	438	206	407	134	88	52

New York Table 5. Long Island Vegetable Research Farm. Dallyn and Fricke.

		Yield-cwt/A				% h.ht > 3 $\frac{1}{2}$	Sp. Gr.
		Total	2 to 3 $\frac{1}{2}$	US #1 > 3 $\frac{1}{2}$	"B" Pickouts		
1969	NY-41	559	346	213	13	0	1.064
	Kat	359	319	40	16	0	1.052
1970	NY-41	592			9	10	1.067
	Kat	396			14	2	1.059
1971	NY-41	370	313	57	9	5	1.074
	Kat	345	303	42	11	0	1.065
1972	NY-41	371	340	31	17	t	
	Kat	178	175	3	12	33	

Long Island verticillium wilt trial. Cetas

		% Stand	Yield-cwt/A		% h.ht	Vine score	Sp.Gr.	% pink eye	% Stem-end browning
			Total	> 2"					
1970	NY-41	100	294	274	0	5.8	1.064	20	48
	Ka	100	282	258	0.3	4.9	1.059	5	85
	Kenn	100	204	175	8.9	6.8	1.059	49	79
1971	NY-41	85	196	180	3.9	5.5	1.060	9.7	53
	Kat	95	224	196	1.9	5.2	1.060	3.8	64

New York Table 6. Vegetable Crops Research Farm at Freeville, N.Y. Sieczka and Ewing.

		Yield-cwt/A								
		Total	US #1				Mis.	Sun.	h.ht	Sp. Gr.
			2 to 3½	> 3¼	> 2"	> 4"				
1970	NY-41	475	168	208	376	8.5	3.6	3.4		1.073
	Kat	404	265	93	358	.9	.9	2.2		1.071
1971	NY-41	523	188	242	430	7.0	3.5	11.0	0	1.073
	Kat	500	149	256	405	6.4	2.9	12.5	5	1.078
1972	NY-41-6"	479	326	115	441	0				
	NY-41-9"	535	335	149	484	1				
	Kat-9"	411	285	9	294	0				
1972	NY-41-10"	465	232	166	398	2	1	5		
	Kat-10"	436	340	23	363	0	0	3		

Vegetable Crops Trial at Elba, N.Y. Sieczka and Ewing.

		Yield-cwt/A	
		Total	> 2"
1972	NY-41-6"	297	245
	Kat 9"	328	246

New York Table 7. Ohio potato variety trials. Lower, Mosley and Wittmeyer.

		cwt/A							
		marketable		% Stand		% Size B		% culls	
		NY-41	Kat	NY-41	Kat	NY-41	Kat	NY-41	Kat
1971	Farm #3	428	335						
	4	418	332						
	5	220	237						
	6	404	300						
	avg			79	85	2.0	4.0	8.8	6.0
1972	Farm M	374	287						
	B	422	305						
	T	361	291						

New York Table 8. Spacing Trials.

Long Island Vegetable Research Farm--1971--Planted April 2--Harvested October 12.

	Yield cwt/A			
	<u>2 to 3½</u>	<u>Size B</u>	<u>Jumbo</u>	<u>Total "A"</u>
Killed August 2	256	11	14	270
Killed August 23	293	10	36	329
Die-down September 15	309	8	53	362
1500 lbs. 8-16-8	317	10	28	345
2200 lbs. 8-16-8	255	9	40	295
Spaced 7"	298	10	31	329
10"	274	9	37	311

Long Island Vegetable Research Farm--1972

	Yield cwt/A			
	<u>2 to 3½</u>	<u>Size B</u>	<u>Jumbo</u>	<u>Total "A"</u>
1600 lbs. 8-16-8	287	26	8	295
2000 lbs. 8-16-8	303	25	12	315
Spaced 7"	295	25	10	320
10"	295	27	11	322

Vegetable Crops--Freeville Farm--1971

	Yield cwt/A				
	<u>2 to 3¼</u>	<u>3¼ to 4</u>	<u>> 4"</u>	<u>Total "A"</u>	<u>"B"</u>
Seedpiece size					
1.5 to 2 oz.	278	221	31	566	34
2.5 to 3 oz.	278	233	20	567	37
Spacing 6"	292	227	18	576	38
9"	264	227	34	558	34

Vegetable Crops--Freeville Farm--1972

	Yield cwt/A (Graded for size only)				
	<u>2 to 3¼</u>	<u>3¼ to 4</u>	<u>> 4"</u>	<u>Total "A"</u>	<u>"B"</u>
Spacing 6"	326	115	0	441	38
9"	335	144	5	484	51

Breeding Program Trials--1971 and 1972

	Yield in cwt/A			
	<u>Total</u>	<u>> 1-7/8"</u>	<u>> 2¼"</u>	<u>% > 2¼"</u>
Ithaca 6"	414	393	356	86
9"	398	376	351	88
Riverhead 6"	410	388	335	82
9"	403	384	338	84

NEW YORK

Joseph B. Sieczka

Results of Potato Variety Trials in Upstate New York, 1971-1972

Four variety trials were conducted by the Vegetable Crops Department of Cornell University in 1972. Another trial was planted on the Canastota muck but was lost when the rains from Hurricane Agnes saturated the mucklands. The four trials harvested were also exposed to a great amount of rainfall but were located on either a well-drained, gravelly mineral soil in Tompkins County, New York or a deep, well-drained muck soil in Elba, New York. Even though water did not collect on the trial sites for a long period of time, the excessive rainfall reduced yields of some, if not all, varieties. The differential effect on varieties is most likely due to the differing growth rates prior to the rains. The two trials initiated on muck soils were established in cooperation with Richard Ackerman and Kenneth Stone, Cooperative Extension Agent and Specialist, respectively.

Six newly named varieties, three standard varieties, and three seedlings were compared in Variety Trial I (see Table 1). Hudson, a variety recently released by the Cornell Potato Breeding Program and previously tested as NY41, produced the highest total and marketable yields. Tubers of this variety are smooth in the medium-size range, but large tubers are somewhat irregular in shape. Skin color is white, and lateral eye depth is shallow. Of the varieties tested, Hudson yielded the highest percentage (35%) of U.S. No. 1 tubers larger than 3-1/4 inches. Katahdin, which was the second highest yielding entry, produced about 78% of its total yield in the U.S. No. 1, 2 to 3-1/4" size range, and only 5% of the total yield was larger than 3-1/4 inches. In a normal year, U.S. No. 1 Katahdin tubers in the 2 to 3-1/4 inch range account for about 35% of the total yield and about 50% are larger than 3-1/4 inches.

Tubers of BR6316-5 are attractive and are oblong in shape. They have shallow eyes and a slightly netted skin. The specific gravity of this seedling was equal to that of NY46 and exceeded only by Russet Burbank. The specific gravity readings of the standard varieties in this trial were higher than they had been in the past, another effect of this year's weather.

Hudson, Katahdin, BR6316-5, Abnaki, Wauseon, Peconic, and B5698-8 tubers have the necessary characteristics to be acceptable on the tablestock market. Line B5698-8 produced uniformly round tubers with shallow eyes and a bright, smooth, white skin in the trial. Unfortunately this seedling did not yield well and proved to be extremely susceptible to scab (see Alba trial and Table 3). Entries not suited for tablestock were Penn 71 which produced irregularly shaped, somewhat flattened tubers and NY46 which had a high percentage of growth cracks.

Hollow heart and internal necrosis did not appear to be problems this year. Line BR6316-5 had the most hollow heart, but this only amounted to 4 hollow heart tubers of the 40 large tubers cut.

Norchip produced the lowest marketable yield in the trial. This low yield undoubtedly resulted from the wet conditions since in the past this variety has yielded about the same as Katahdin.

Variety Trial II. Four USDA seedlings and one seedling from each of the potato breeding programs of New York, Pennsylvania, and North Carolina were compared to Katahdin in Variety Trial II at Freeville, New York (see Table 2). Five of the entries produced higher marketable yields than Katahdin, but each has at least one drawback which the standard variety does not.

Line BR6626-5 produced round to oblong, irregularly shaped tubers with a scurfy white skin. Tubers of B6986-2 were the largest in the trial (average tuber weight = 7 oz) but were susceptible to growth cracks and hollow heart. Skin color of this seedling is white with pink eyebrows. Line J333-2 produced slightly irregular-shaped, round to oblong tubers with a scurfy white skin. This entry had the lowest specific gravity and matured the earliest in the trial. Tubers of NC6462-3 were slightly irregular in shape and had a tendency to growth crack. Tubers of B6987-25 were oblong and attractive in appearance even though the skin was slightly checked.

Elba Trial. Abnaki produced the highest total and marketable yields and the largest average-size tubers in a trial on the Elba muck (Table 3). Tubers of this variety tended to be oblong at this location rather than mostly round as they had been in other trials. Skin texture was exceptionally smooth giving the tubers a bright appearance. The variety showed its tendency toward hollow heart having almost 25% of the large tubers cut damaged by this disorder.

Wauseon produced the second highest yields, but average tuber size was almost 2 oz less than Abnaki. Tubers of this scab- and golden nematode-resistant variety were mostly round with a slightly scurfy white skin. The highest specific gravity was produced by Peconic, but this variety also produced the smallest tubers, having a high percentage less than 2 inches in diameter. All varieties were affected by scab, but Katahdin and Peconic tubers were most affected by this disease.

Trial with Alaskan Selections. This trial was conducted in cooperation with Curtis H. Dearborn, USDA Research Horticulturist in Alaska, to observe the performance of Alaskan selections under New York conditions. Seed of all entries were supplied by Dr. Dearborn. Line AK35 yielded and appeared much like Kennebec; however, the average tuber size was somewhat smaller than Kennebec. The specific gravity of AK90 was the highest recorded in any of the trials conducted in 1972. Tubers of this selection are slightly irregular in shape and have a white skin. The skin color of Alaska Frostless tubers is white with purple blotches. Tubers of Alaska Frostless were flattened, irregular in shape, and had a tendency to growth crack.

Storage Results. Samples of three field trials conducted in 1971 were subjected to tests for chip color in January 1972. In addition to the test for chip color, measurements on aftercooking darkening and sprout growth were taken on samples from two of the trials.

Chip color determinations are made in the following manner. For every variety, a ten-pound tuber sample is taken from each of four replications in the field. Treatments within a replication are stored together, and frying of all treatments in a given replication is completed before the next replication is started. Treatments are fried in random order within each replication.

Fifteen tubers from each sample are cut lengthwise from the stem end to the apical end. One-half is discarded, and from the other half the peeling is removed in a band next to the cut surface, taking care not to peel deeply. With a rotary hand slicer set to cut 18 slices per inch, one slice is cut and discarded from the tuber half. One more slice is cut and saved. When one slice has been obtained from each of the 15 tubers in the sample, all are dipped in tap water, drained briefly, and fried immediately. Oil temperature is 365° F before frying starts. Frying is continued until bubbling has subsided and chips are crisp.

After chips have cooled and excess oil has drained off, they are placed in cellophane bags until Agtron meter readings can be made. Chips are crushed to a granular consistency with the largest pieces being approximately 1/8-inch diameter. The chip fragments are poured into holders for light reflectance measurement on a Model F22 Agtron meter. The meter is set at zero with the 5005 standard and at 100 with the 5052.5. Minimum values for "generally acceptable chip color" would range from 55 to 65.

All but 4 varieties listed in Table 5 produced light-colored chips when tuber samples were stored at 50° F from time of harvest. Penn 71 (6HS9) produced the lightest chips when stored at this temperature. However, only BR5960-5 made acceptable colored chips when the storage temperature was 45° F. Line B6567-12 and Russet Burbank were virtually free from aftercooking darkening, while BR6316-5, B6529-12, B6518-4, and Penn 71 were susceptible to darkening. Line BR6316-5, Hudson, and Russet Burbank produced the least amount of sprout growth when stored at 50° F until March 13, 1972. Line B6567-12 generated the most sprout growth.

Line NY46 and Katahdin produced very light-colored chips and the most sprout growth at 50° F in the variety trial with New York selections (see Table 6). Line B6097-7, grown in the guard row, sprouted very rapidly in storage. Lines NY48 and BR6273-1 were relatively free from aftercooking darkening.

In the Madison County early variety trial, Cascade made the darkest chips shortly after harvest and after 7 weeks of 50° F storage (see Table 7). Norchip and B5698-8 produced very light-colored chips at both dates.

Acknowledgements. Seed for the trials were obtained from the following sources: Hudson, NY46, J333-2, and J59-10 from R. L. Plaisted; Penn 71, 7NS2, and NC6462-3 from James Watts, Wise Foods; seedlings prefixed by BR from C. E. Cunningham, Campbell Institute for Agricultural Research; Alaskan selections from Curtis Dearborn, USDA; all other seed obtained from R. E. Webb, USDA.

The cooperation of J. Coulter, A. Vigneri, R. Ackerman, and K. Stone is appreciated.

Upstate New York Table 1. Variety trial I, Freeville, N.Y., 1972^{1/}

Variety	Total Yield cwt/A	U.S. No. 1			
		cwt/A 2" to 4"	% of Total Yield		
			2" to 3-1/4"	3-1/4" to 4"	>4"
Hudson (NY41)	468	389	50	33	1.8
Katahdin	435	362	78	5	0
BR6316-5	404	345	77	8	0
Abnaki	372	344	76	17	0
Kennebec	451	320	55	16	0
Wauseon	374	319	73	13	0.5
Penn 71	371	305	71	12	0
Peconic	372	279	71	4	0
NY46	390	273	63	7	0
Russet Burbank	330	258	78	0	0
B5698-8	337	237	68	3	0
Norchip	358	233	62	3	0
D _(.05) Tukey	84	78			

Variety	Mean Tuber Wt. (oz)	Specific Gravity	Vine ^{2/} Maturity	% of Total Yield		Hollow Heart ^{3/}
				Mis.	Sunburn	
Hudson (NY41)	6.4	1.090	5	1.1	5.0	0/40
Katahdin	4.9	1.082	6	0.2	3.0	1/40
BR6316-5	5.4	1.091	4	0.8	1.8	4/40
Abnaki	5.5	1.081	8	0.4	0.2	0/40
Kennebec	6.7	1.085	6	16.5	6.3	0/40
Wauseon	4.9	1.075	7	0.4	1.2	1/40
Penn 71	5.4	1.083	6	3.0	2.8	3/40
Peconic	4.0	1.088	7	-	1.6	0/40
NY46	4.2	1.091	3	9.9	1.2	0/40
Russet Burbank	5.1	1.093	3	4.4	-	0/40
B5698-8	3.6	1.072	8	1.0	0.2	0/40
Norchip	3.6	1.086	7	3.3	0.6	0/40
D _(.05) Tukey	0.5	0.007				

^{1/} Planted May 11, 1972; within row spacing 10"; between row spacing 34";
1500 lb/A of 10-20-20 applied at planting; killed September 10, 1972;
harvested September 21, 1972; 4 replications.

^{2/} Vines rated for maturity on September 6, 1972; 1-9: 9 = completely dead;
1 = completely green.

^{3/} Numerator = number of tubers with hollow heart; denominator = total number
of tubers observed.

Upstate New York Table 2. Variety trial II, Freeville, N.Y., 1972^{1/}

Variety	Total Yield cwt/A	U.S. No. 1			
		cwt/A 2" to 4"	% of Total Yield		
			2" to 3-1/4"	3-1/4" to 4"	>4"
BR6626-5	451	383	60	25	0.4
B6986-2	472	364	44	33	1.5
J333-2	376	341	72	19	0.9
NC6462-3	417	324	72	6	0
B6987-25	374	313	75	9	0
Katahdin	408	305	73	2	0
7NS2	340	251	70	8	0.4
B6955-24	319	241	72	4	0
D _(0.5) Tukey	58	78			
Guard ^{4/} J59-10	479	429	63	26	-

Variety	Mean Tuber Wt. (oz)	Specific Gravity	Vine ^{2/} Maturity	% of Total Yield		Hollow Heart ^{3/}
				Mis.	Sunburn	
BR6626-5	6.5	1.091	6	4.2	2.9	0/40
B6986-2	7.0	1.092	7	17.1	0.7	10/40
J333-2	6.1	1.077	9	1.8	0.7	0/40
NC6462-3	4.2	1.082	7	4.9	0.8	1/40
B6987-25	5.2	1.091	8	0.9	0.2	5/40
Katahdin	4.0	1.089	6	0.2	2.6	1/40
7NS2	4.8	1.093	7	14.9	0.6	1/40
B6955-24	4.1	1.091	9	1.0	1.9	0/40
D _(0.5) Tukey	0.5	0.004				
Guard ^{4/} J59-10	6.2	-	9	1.0	0.5	0/10

^{1/} Planted May 15, 1972; within row spacing 10"; between row spacing 34";
1500 lb/A of 10-20-20 applied at planting; killed September 10, 1972;
harvested September 25, 1972; 4 replications.

^{2/} Vines rated for maturity on September 6, 1972; 1-9: 9 = completely dead;
1 = completely green.

^{3/} Numerator = number of tubers with hollow heart; denominator = total number
of tubers observed.

^{4/} Guard row not replicated.

Upstate New York Table 3. Variety trial on muck soil, Elba, N.Y., 1972^{1/}

Variety	Yield (cwt/A)		% of Total Yield			Mean Tuber Wt. (oz)	Specific Gravity	Hollow Heart ^{2/}
	Total	U.S. No. 1 >2"	U.S. No. 1 >2"	Scab	Sunburn			
Abnaki	374	334	89	4.9	0.6	7.3	1.069	9/40
Wauseon	368	318	86	2.4	0.2	5.5	1.071	2/40
Katahdin	328	245	75	11.9	2.9	5.6	1.070	1/40
Hudson (NY41)	297	245	82	3.2	3.2	5.3	1.067	1/40
Peconic	339	207	61	9.3	2.0	3.6	1.076	0/40
D (.05) Tukey	56	60				0.8	0.002	

^{1/} Planted June 14, 1972; within-row spacing 9" for all varieties except Hudson, which was 6"; between-row spacing 34"; 1500 lb/A of 5-10-10 broadcast prior to planting; harvested October 18, 1972; 4 replications.

^{2/} Numerator = number of tubers with hollow heart; denominator = total number of tubers observed.

Upstate New York Table 4. Variety trial with Alaskan selections, Freeville, N.Y., 1972^{1/}

Variety	Yield (cwt/A)		% of Total Yield			Mean Tuber Wt. (oz)	Specific Gravity	Vine Maturity ^{2/}
	Total	U.S. No. 1 2-4"	2 to 3-1/4"	U.S. No. 1 3-1/4 to 4"				
AK35	466	352	66	11		3.6	1.087	6
Kennebec	412	352	83	15		5.2	1.086	6
AK90	376	266	62	9		4.0	1.118	1
Alaska Frostless	312	202	65	1		3.2	1.095	3
D (.05) Tukey	104	118				1.9	0.007	

^{1/} Planted May 11, 1972; within row spacing 10"; between row spacing 34"; 1500 lb/A of 10-20-20 applied at planting; killed September 10, 1972; harvested September 21, 1972; 4 replications.

^{2/} Vines rated for maturity on September 6, 1972; 1-9: 9 = completely dead; 1 = completely green.

Upstate New York Table 5. Variety trial, Freeville, N.Y., 1971

Chip Color and Storage Results				
Variety ^{1/}	Chip Color ^{2/} Agtron Meter Readings		Aftercooking ^{3/} Darkening Rating 1/12/72	Sprout Weight as % of Total Weight ^{4/} 3/13/72
	45°	50°		
BR5960-5	59	69	4.4	6
BR6312-2	9	16	4.6	4
BR6316-5	44	68	3.7	1
B6567-12	25	50	4.9	8
B6518-4	24	50	3.6	3
Hudson (NY41)	25	53	4.3	1
Katahdin	45	69	4.5	5
Penn 71 (6HS9)	49	74	3.6	2
B6139-11	46	71	4.4	2
Kennebec	45	63	3.9	3
Russet Burbank	46	60	4.7	1
B6529-12	40	62	3.7	3
D _(.05) Tukey	14	13	0.8	3

^{1/} Varieties ranked in descending order of U.S. No. 1 (2-4") yields.
(See 1971 report).

^{2/} Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.2 gave readings of 0 and 100, respectively. Higher values indicate lighter chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65. Samples were stored at temperatures indicated from shortly after harvest until time of frying on January 3 and 4, 1972.

^{3/} Five tubers of each of 4 field replications were peeled and dipped in 0.5% sodium bisulfide, cooked for 7 minutes in an autoclave at 15 p.s.i., and rated 1-5: 1 = severe aftercooking darkening; 5 = no darkening.

^{4/} Stored at 50° F.

Upstate New York Table 6. Trial with N.Y. selections, Freeville, N.Y., 1971

Chip Color and Storage Results			
Variety ^{1/}	Chip Color ^{2/} Agtron meter readings 50°	Aftercooking darkening ^{3/} 1/13/72	Sprout weight as % of total weight ^{4/} 3/13/72
NY51	54	4.2	6
B6558-16	57	4.0	2
NY46	69	4.4	2
NY48	50	4.9	2
NY47	58	4.1	1
NY45	52	4.3	1
Katahdin	63	4.3	6
BR6273-1	54	4.7	3
D(.05) Tukey	11	0.7	2

<u>Guard Row</u>			
B6097-7	55	4.4	11
B6545-20	54	4.2	7

^{1/} Varieties ranked in descending order of U.S. No. 1 (2-4") yields.
(See 1971 report).

^{2/} Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.2 gave readings of 0 and 100, respectively. Higher values indicate lighter chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65. Samples were stored at temperatures indicated from shortly after harvest until time of frying on January 5, 1972.

^{3/} Five tubers of each of 4 field replications were peeled and dipped in 0.5% sodium bisulfide, cooked for 7 minutes in an autoclave at 15 p.s.i., and rated 1-5: 1 = severe aftercooking darkening; 5 = no darkening.

^{4/} Stored at 50° F.

Upstate New York Table 7. Early variety trial, Madison County, N.Y., 1971

Chip Color Results		
Variety	Agtron meter readings ^{1/}	
	9/11/71	10/28/71
Cascade	57	31
Norchip	74	67
B5698-8	76	69
B6448-8	68	54
D(.05) Tukey	15	16

<u>Guard</u> ^{2/}		
B6097-7	87	51
Sable	-	-
Abnaki	68	60

^{1/} Color of crushed chips of Agtron F reflectance colorimeter set so that discs 5005 and 5052.2 gave readings of 0 and 100, respectively. Higher values indicated lighter chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65. Samples were stored at temperatures indicated from shortly after harvest until time of frying on October 28, 1971.

^{2/} Guard row not replicated.

NORTH CAROLINA

F. L. Haynes

Breeding Program

The primary objectives continue to be the production of early-maturing varieties with superior chipping quality, adaptation to the Coastal Plain, and the incorporation of resistance to major diseases, principally common scab.

Hybridization. Crossing was done during July in the crossing room. Using the cut-stem technique with inflorescences harvested from field plots and pollen previously collected and stored, crosses were successfully made in quantity in a minimum of time. Fourteen selected parents produced 61 crosses from which seed was harvested. Fruits were mature in 45 days.

Seedling Production and Maintenance. Approximately 10,000 single hills were grown in the field from which 740 clones were selected for further trial. From previously selected clones, 423 were grown at one or more locations either in the mountains or both there and on the coast. From these, 108 were reselected for evaluation in 1973. All breeding clones are grown for seed maintenance and increase at Waynesville in the mountains.

Eastern Trials. Selected clones were tested at four locations in the early commercial area. A primary trial of 78 clones was conducted at the Tidewater Station. Advanced trials for field performance and processing quality were conducted at three locations. The design was RCB and included augmented entries at one location. In addition to the North Carolina clones, the trials included USDA breeding lines. The USDA (B) clones included were all selections made in North Carolina from segregating families provided by the National Program. The results of the advanced trials are presented in North Carolina Tables 1-3. Rainfall distribution was near normal for the season. A cold wave on March 26 froze the soil to a depth of two inches, however, and a subsequent frost on April 16 further delayed the early emerging varieties. The early-maturing varieties appeared to be severely penalized and normal maturity altered so that ratings for this attribute are probably not reliable. Despite the early season freezes, yields were normal.

Adaptation Study

This project is a study of the adaptation to the temperate zone of cultivated diploid Andean species. The two species S. phureja and S. stenotomum are being grown in large populations and mass selected for several tuber attributes as well as for responses to photoperiod. The selected families are potential sources of new germplasm for commercial exploitation. Two populations were grown at Fletcher. These were: (1) 7,500 segregating seedlings of 45 families from which 2,400 tuber clones were selected; (2) a tuber planting of 2,040 clones from 56 families (40 completing the 3rd cycle and 16 new families). This planting produced seed for the 1973 segregating population. In addition, 25-hill rows of 23 clonal selections from 1971 were grown and evaluated for tuberization in August. All tuberized under long days. Tuber size and number and percentage of segregates tuberizing continued to improve in the selected families. These segregating families will be evaluated in 1973 and clonal selections isolated.

North Carolina Table 1. Potato performance trial at Aurora. Plots were 2 rows by 20 ft., 4 replications. Planted 3/6/72, harvested 6/27/72 (112 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 2000 lbs/A 8-8-8.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear- ^{2/} ance	Maturity
68C5-13	242	88.3	1.074	7.6	7.0	Med. early
Penn-71	239	93.6	75	2.2	7.0	Med. late
Pungo	232	94.1	81	2.8	7.2	Mid-season
LaChipper	224	90.1	75	2.2	8.0	Med. early
B7127-N9	220	96.5	81	5.4	7.2	Mid-season
Superior	212	87.1	79	1.8	8.5	Early
B6597-N3	212	94.1	85	1.6	8.0	Med. early
B6973-N4	211	91.7	71	5.0	8.2	Med. early
B7031-N2	203	91.2	76	5.0	8.0	Med. early
58C19-2	202	91.0	81	4.2	7.0	Med. early
B7124-N1	201	90.6	75	4.6	7.7	Med. early
B7127-N10	200	94.0	83	4.0	8.2	Med. early
Norchip	198	93.3	84	2.4	7.7	Med. early
B7127-N2	197	93.2	77	1.8	8.0	Med. early
68C5-1	195	90.2	83	5.0	8.2	Early
B7012-N25	194	91.5	76	3.6	8.0	Early
64C2-3	192	93.0	73	2.2	7.0	Mid-season
58C19-2W	189	90.0	84	4.4	8.0	Med. early
64C2-5	188	89.1	77	3.6	6.7	Mid-season
68C5-18	185	88.7	86	4.2	7.0	Mid-season
B6546-N4	174	85.6	74	2.8	8.0	Med. early
68C5-22	144	85.5	-	-	8.0	Early
B6937-N3	143	84.9	77	2.6	8.2	Early
B6930-N4	125	88.3	81	3.0	7.5	Early
L.S.D. .05	44	3.7				
C.V. (PCT)	16	2.9				

^{1/} Chip color determined by Wise Foods, Borden, Inc., Berwick, Pa. Average of 5 samples, 1 per week for 5 weeks following harvest. 1-4 acceptable with grade 1=perfect; 5 usable but not desirable, 6-14 unacceptable with 14=black.

^{2/} Appearance
 1 = Very poor 7 = Good
 3 = Poor 9 = Excellent
 5 = Fair

North Carolina Table 2. Potato performance trial at Pasquotank. Plots were 2 rows by 20 ft., 4 replications. Planted 3/9/72, harvested 6/29/72 (110 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 1500 lbs/A 10-20-20.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear- ^{2/} ance	Maturity
B7031-N2	356	92.9	-	-	8.0	Med. early
68C5-13	350	85.7	1.060	9.4	7.0	Mid-season
B6973-N4	350	81.6	57	6.0	8.8	Med. early
64C2-3	346	90.3	66	3.6	7.0	Mid-season
58C19-2	331	89.5	69	5.2	7.0	Med. early
B7127-N9	330	92.2	70	6.2	9.0	Med. early
LaChipper	322	88.9	67	2.2	8.2	Med. early
68C5-18	316	91.9	71	5.2	8.2	Med. early
B7124-N1	313	92.6	-	6.6	8.5	Med. early
64C2-5	308	86.5	71	4.2	7.0	Mid-season
Katahdin	307	85.4	-	-	8.0	Late
68C5-1	306	86.0	69	6.8	6.7	Mid-season
B7012-N25	292	92.8	69	5.8	8.5	Med. early
B6937-N3	279	83.8	62	2.6	8.7	Med. early
Pungo	278	84.5	72	5.4	7.0	Mid-season
Penn-71	278	88.6	66	3.8	8.0	Med. late
B7012-N18	277	89.9	62	5.8	9.0	Early
Superior	272	89.7	69	3.2	8.7	Early
Norchip	272	81.3	72	3.0	8.0	Med. early
B7127-N2	270	93.2	64	2.8	7.7	Mid-season
58C19-2W	270	82.0	70	5.0	7.0	Med. early
B6597-N3	249	84.4	72	2.4	7.7	Med. early
B6930-N4	226	85.3	-	-	7.0	Med. early
68C5-22	175	83.7	-	-	8.0	Early
L.S.D. .05	46	4.2				
C.V. (PCT)	11	3.4				

^{1/} and ^{2/}, See footnotes, N. C. Table 1.

North Carolina Table 3. Potato performance trial at Columbia. Plots were 1 row by 30 ft., 47 entries in 4 replications, RCB design with 20 augmented entries. Planted 3/7/72, harvested 6/30/72 (114 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 1300 lbs/A 10-20-20.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear ^{2/} ance	Maturity
Red Pontiac	403	93.0	-	-	7.0	Med. early
B6973-N4	393	90.5	1.062	5.2	9.0	Med. early
64C2-3	359	94.5	64	2.2	7.5	Mid-season
B7031-N2	340	92.4	66	5.2	8.2	Med. early
Pungo	333	89.5	70	4.0	7.0	Mid-season
62C8-6	331	90.0	66	5.0	8.7	Med. early
68C5-13	326	88.7	66	8.4	7.2	Mid-season
B7127-N10	325	95.6	72	6.0	9.0	Med. early
B7127-N9	321	93.9	73	5.0	8.5	Med. early
58C19-2	313	91.5	70	5.0	7.0	Med. early
B7012-N20	310	90.8	75	4.2	7.0	Mid-season
69C36-1	298	89.6	77	3.0	7.0	Mid-season
Penn-71	295	86.8	70	3.0	7.0	Med. late
B7127-N22	290	90.6	70	4.4	8.5	Mid-season
B7127-N18	282	91.3	70	3.6	8.2	Mid-season
Katahdin	278	77.3	-	-	7.0	Med. early
LaChipper	277	90.5	68	2.2	8.0	Med. early
B7127-N2	274	93.2	65	2.0	8.5	Med. early
58C19-2W	261	87.0	74	5.2	7.0	Med. early
Norchip	258	83.6	76	1.8	8.0	Med. early
B7033-N4	254	85.5	71	3.0	8.7	Med. early
B7008-N4	253	84.9	64	5.6	9.0	Early
B7012-N18	253	90.1	67	5.8	7.7	Med. early
B7335-N3	251	79.4	78	5.4	7.7	Early
B7120-N13	246	84.1	65	2.4	7.7	Med. early
B6546-N4	243	85.2	60	4.0	8.0	Early
B6937-N3	230	88.0	68	2.6	8.2	Med. early
69C7-9	230	90.8	77	5.8	7.0	Mid-season
Superior	228	90.3	71	1.8	9.0	Early
B6930-N4	226	84.3	67	4.6	7.7	Med. early
B6598-N3	217	91.9	74	1.6	8.0	Med. early
B6955-N4	214	84.8	82	4.0	8.0	Med. early
B7012-N12	208	88.5	67	4.0	8.0	Med. early
68C5-1	206	84.0	72	6.2	6.5	Med. early
B6937-N12	203	63.5	65	4.2	7.0	Mid-season
69C3-3	199	87.8	69	4.4	7.5	Med. early
B6943-N1	198	87.4	79	5.4	7.7	Mid-season
68C5-9	186	75.6	78	3.8	7.0	Med. early
B7126-N1	177	75.0	65	4.4	7.7	Med. early

North Carolina Table 3 continued.

B6987-N24	176	90.2	74	3.6	8.0	Med. early
69C14-4	165	89.2	78	5.4	7.2	Med. early
B7034-N6	162	82.4	70	4.6	8.5	Early
68C5-22	161	80.9	-	-	7.0	Med. early
B6987-N29	159	90.6	73	4.2	7.2	Med. early
B7335-N9	149	73.6	74	4.8	8.2	Early
69C7-12	148	81.9	87	4.4	8.5	Early
B6987-N36	113	83.3	79	1.2	8.0	Early

Augmented entries - Rep. 1 - adjusted yields

B7335-N5	303	88.1		8.1	Early
B7127-N3	255	90.5		8.1	Med. early
69C38-4	237	81.0		8.0	Med. early
B7335-N6	211	68.2		7.2	Med. early
B7031-N1	190	82.6		5.1	Mid-season

Augmented entries - Rep. 2 - adjusted yields

B7340-N7	344	78.5		7.0	Mid-season
B7335-N16	236	88.1		8.0	Mid-season
B7587-N4	205	79.6		7.0	Med. late
B6987-N30	196	87.9		9.0	Early
B7340-N12	170	57.2		7.0	Mid-season

Augmented entries - Rep. 3 - adjusted yields

68C6-1	232	86.4		8.0	Med. early
B7335-N8	223	86.8		8.0	Med. early
B7335-N1	163	83.1		5.0	Mid-season
69C20-10	106	88.0		8.0	Early
64C2-9	75	91.5		9.0	Very early

Augmented entries - Rep. 4 - adjusted yields

B6959-N1	292	85.4		7.9	Med. early
B7335-N17	271	86.9		6.8	Mid-season
B7587-N3	236	90.9		6.9	Mid-season
68C5-8	210	85.3		5.0	Mid-season
B6990-N3	144	86.6		7.8	Early

L.S.D. (.05) Replicated entries (RE), augmented (AE)

RE	41	5.6		.5
AE same rep.	83	11.3		1.1
AE idf rep.	84	11.4		1.1
RE vs AE	66	9.0		.9
CV (PCT)	11.8	4.6		4.9

NORTH DAKOTA

Robert H. Johansen and Joseph E. Huguelet

Potato Breeding Program

Potato Crossing Program. During February and March, 257 potato crosses were made in the greenhouse. Material used in the breeding program involved parents with good processing quality, type, bright red skin color, russeting, disease resistance, high yield and good quality. Seed was extracted from the berries during June and was ready for planting in the greenhouse during July.

Greenhouse and Field Seedlings. Thirty-five thousand seedlings representing 192 families were transplanted into greenhouse benches during July and August. Seedlings were harvested during July and August.

At Langdon, approximately 30,000 seedling tubers were planted on May 17 and May 18. At harvest on September 18, 19, and 20, 737 clones were saved for further study and testing. Again all of these clones will be tested for spindle tuber virus in the greenhouse and in the Florida test plot. The diseased and poor type clones naturally will be discarded.

Advanced Selections. The advanced selections grown at Grand Forks were harvested on September 14 and 15 and at Casselton on September 26 and 27. From the 578 advanced selections that were tested, 148 were saved at harvest.

The amount of seed both planted and harvested was much less this year. The reason for this is that most of the seed planted now has been tuber indexed in Florida and in the greenhouse. It is hoped that in a few years all seed will be completely free of spindle tuber virus and that larger amounts of seed will be available for both increase and testing.

Several hundred advanced breeding lines from the USDA, Campbell Soup Company and Frito-Lay, Inc. were planted in test plots at Grand Forks. Several of these selections looked good and will be included in the breeding and testing program.

Promising Selections. The advanced selections ND6634-2R, ND7641-2 Russ, ND7103-4 and ND7196-18 have been tested in the program for the past four to five years and all appear promising. Line ND7196-18 has been tested in the North Central Regional trial for three years and has been in the state-wide trial for four years. Line ND7196-18 is a medium early, white-skinned selection that has good chip quality and some late blight resistance. This selection is much like Norchip in that it sets many tubers and under dry conditions it could produce many small sized tubers. Its shape is round-oval and very smooth.

Line ND6634-2R is a smooth, bright red selection. Its type is oblong-round, has excellent shape and the yield and specific gravity are quite good.

Line ND7642-2 Russ is an oblong-long russet that has beautiful russet skin. It is a sister selection of ND7642-3 Russ. Hollow heart has been observed but the degree has not been determined. Hollow heart resistance seems to be the most difficult characteristic to obtain in a russet variety.

Selection ND7103-4 is an oblong-round white that has good chipping quality. Yield is satisfactory and the specific gravity is high. The future of this selection is unknown.

Selection ND6925-13 Russ and ND6993-13 Russ were grown commercially for both processing and fresh use during 1972. The future of these selections does not look promising and unless additional tests prove otherwise there is a possibility that they will be dropped from the program and from commercial testing.

Processing and Culinary Tests. Again the processing laboratory at East Grand Forks, Minnesota, Wise Potato Chip Company, and the Pillsbury Company conducted tests on several advanced selections. These tests are valuable in that it shows how a certain selection will perform when compared to a good check variety or a good processed product.

One hundred ninety advanced selections were tested for chipping by the processing laboratory at East Grand Forks. From these tests twenty-two of the North Dakota selections and thirteen Campbell Soup selections had an Agtron reading of 40 or above. In 1972-73 several hundred new selections will be tested for chips and some of the more promising new and old selections will be tested for flake and french-fry quality.

Two replicates of eleven varieties and selections stored at 40° F were tested for chip quality on January 10 and then stored at 70° F and chipped every seven or fourteen days until the final tests on February 8 (Tables 1 and 2). Norchip was similar to Monona in whiteness of the chip. However when comparing the two varieties in trial for yield and specific gravity, Norchip is much superior to Monona. Because of its low yield and specific gravity and its susceptibility to wilts, Monona is not considered as a highly recommended variety for North Dakota. Lines ND7196-18 and ND7103-4 produced very white chips after reconditioning at 70° F for two to three weeks.

The Wise Potato Chip Company tested for chip quality seven selections and three check varieties. Samples were chipped on arrival on October 13 and at 3 monthly intervals. For the first test on January 25, the samples were stored at 45° F and at 70° F on February 29 and March 24. Lines ND7103-4 and ND8603-6 had the best chip color and ND7196-18 appeared to be the least affected by the low temperature storage. Twelve North Dakota selections will be tested during the winter of 1973.

The Pillsbury Company tested for flake quality six advanced North Dakota selections. All samples were processed into instant mashed potato flakes and its quality determined. In addition, total solids, total sugar, reducing sugar, ash and nitrogen were determined.

Twenty-three varieties and North Dakota selections were tested by the Horticulture Department for boiling and baking quality (Tables 3 and 4). A wide range of tests and determinations were made but in general the high, dry matter selections were better for baking and much mealier when boiled. The whiteness of a particular selection or variety was probably the most important test or evaluation taken.

Variety Trials. Replicated variety trials were grown at Grand Forks, Park River, Williston, Minot, and under dry land and irrigation at Carrington. Ben Hoag was in charge of the trial at Minot and Ernest French was responsible for the Williston trial. Howard Olson and Frank Sobolik conducted the trial at Carrington; while at Park River, Wayne Grinde and Jerry Huebner were in charge. At Grand Forks, Don Uhler was in charge of the maintenance of the trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block.

Twenty-eight varieties and selections were planted at Grand Forks and Park River and eighteen were tested in trial at Carrington. The trials at Minot and Williston consisted of sixteen entries. Marketable yields consisted of all U.S. No. 1 tubers over 1-7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing, fertilizer, soil type, planting and harvest dates of each location were as follows:

<u>Location</u>	<u>Row</u>	<u>Plant</u>	<u>Fertilizer</u>	<u>Soil Type</u>	<u>Planting Date</u>	<u>Harvest Date</u>
Grand Forks	38"	12"	200# 20-20-10	Bearden clay loam	5-15	9-21
Park River	36"	12"	300# 20-20-10	Glyndon silt loam	5-10	9-11
Minot	42"	14"	None	Williams loam	5-18	9-21
Williston	38"	14"	None	Williams loam	5-23	9-16
Carrington (Irr.)	36"	8"	300# 15-38-10	Kief loam	5-9	9-22
Carrington (dry)	36"	12"	300# 15-38-10	Kief loam	5-9	9-21

The 1972 growing season was for the most part dry and quite cool. This dry condition can be reflected in the yields which were somewhat lower than those obtained in 1971. At Grand Forks, 1.90 inches were received in June while July and August had 1.85 and 1.80 inches, respectively. At Minot it was wet at the start of the season, dry during late June and July and then wet during August. At Williston it was cool and had above normal rainfall while at Park River ample moisture occurred early in the season but it was dry during July and August. The irrigated trial at Carrington yielded much more than the dry land trial reflecting the dryness at this station during part of the season.

The late maturing varieties Kennebec, Red Pontiac, Chieftain and Viking produced the highest yields. For these varieties most of the yield was obtained during the very last two weeks of the season. Selection ND7196-18, Norchip and Cascade also produced good yields (Table 5).

Because they were seriously infected with virus diseases, data was not taken on several advanced selections. This included the russet selections ND7642-2 Russ and ND7642-3 Russ. No doubt the spread of virus disease to other selections and varieties grown in trial also reduced their yields.

Of the varieties grown only in trials at Grand Forks, Park River and Carrington, the white chipping selection ND8608-2 looked the best. This selection produced yields comparable to Norchip and other early-maturing varieties. Line DT6063-1R, a selection originating as a seedling in North Dakota and now being considered for introduction by Colorado looked only fair in trial. Yield was satisfactory but the selection seemed quite susceptible to silver scurf which dulled its color.

The irrigated trial at Carrington again outyielded the dry land trial by an average of a little over 200 cwt/A. The Grand Forks trial yielded less than the Park River trial. This can be contributed to the dryness at Grand Forks and that the first two replications in the Grand Forks trial were planted in poor soil.

The Park River trial produced the highest specific gravity (Table 6). Williston also produced fairly high specific gravity and the dry land trial at Carrington was higher in specific gravity than the irrigated trial.

Norchip produced the highest specific gravity followed by Kennebec and ND7196-18. All three of these varieties and selections are good for chipping and this indicates the degree of quality potato chip manufacturers receive when they buy potatoes from the Red River Valley.

Potato Disease Testing--1972. The level of resistance of 12 advanced potato lines to potato virus X (PVX) and potato spindle tuber virus (PSTV) was determined. Two advanced lines 6647-1R and 7196-18 were determined to be resistant to PVX and three newer lines showed some resistance.

A total of 2,178 tubers of 928 selections were indexed for PSTV and PVX, 11 percent of the tubers from 15 percent of the new seedling selections were found to be infected with PSTV; older selections had 15 percent PSTV. Florida observations were correlated with the tomato assay test in the greenhouse for PSTV; 7 selections were identified as PSTV infected in Florida, but were not identified by the tomato test. A total of 68 lines were identified as virus infected in Florida while 208 were shown to be infected with PSTV or PVX in the greenhouse.

Scab and silver scurf resistance was evaluated on 568 potato selections. Eight new white selections were scab resistant, two older selections 8724-3 Russ and 8850-2 have repeatedly shown resistance. Resistance to late blight and verticillium wilt was evaluated in advanced selections and resistance was apparent in 6634-2R, 7196-18, 8105-1R and 6673-4 to late blight. Wilt resistance was apparent in 6647-1R, 8106-1 and 8168-6R.

North Dakota Table 1. 1972 chip tests of varieties and selections grown at Grand Forks, North Dakota, during 1971

	January 10			January 24			February 1			February 8		
	Color Chart	Yield		Color Chart 1/	Photo Volt 2/	Yield 3/	Color Chart	Photo Volt	Yield	Color Chart	Photo Volt	Yield
Cobbler	10.8	33.5		9.3	12.6	32.8	8.0	24.0	33.1	8.3	17.0	32.8
Kennebec	10.5	33.0		7.8	17.7	33.0	7.5	21.9	32.0	7.8	30.5	33.8
Monona	9.3	32.5		6.3	24.3	32.8	5.8	30.9	31.0	4.0	31.0	33.8
Norchip	9.8	32.8		7.8	22.5	33.5	6.5	29.8	34.2	4.0	31.5	35.5
ND6925-13 Russ	10.3	33.8		9.5	12.9	32.5	9.5	11.9	33.7	9.0	16.8	35.8
ND6993-13 Russ	10.3	36.0		7.8	19.6	33.3	6.8	26.8	34.8	6.0	28.3	35.0
ND7103-4	9.3	36.5		6.8	24.3	34.0	6.9	29.5	35.3	6.5	34.0	35.3
ND7196-18	9.0	35.0		7.8	19.3	34.0	5.5	34.8	32.2	6.0	35.8	32.3
ND7642-3 Russ	10.0	34.8		9.8	14.3	34.0	10.0	12.0	31.5	9.5	15.7	33.4
ND7755-3 Russ	9.8	34.3		8.8	16.2	34.3	8.5	19.4	33.2	6.8	23.0	34.5
ND7761-33 Russ	11.0	36.3		8.8	14.4	34.8	9.0	16.5	34.4	9.5	20.5	34.5

1/ Color Chart - 1 = light 11 = dark

2/ Photovolt - higher numbers are lighter in color

3/ Yield - percent chip yield

North Dakota Table 2. 1972 chip tests of varieties and selections grown at Grand Forks during 1971

	January 10			January 24			February 1			February 8		
	Color Chart	Yield		Color Chart 1/	Photo Volt 2/	Yield 3/	Color Chart	Photo Volt	Yield	Color Chart	Photo Volt	Yield
Cobbler	9.3	33.8		8.8	14.5	33.0	7.5	24.1	31.6	6.0	20.8	32.8
Kennebec	8.3	34.0		5.5	27.5	33.0	4.5	34.6	32.4	3.8	29.4	33.3
Monona	8.0	31.7		3.0	36.1	32.8	5.0	32.5	30.9	3.5	33.1	34.8
Norchip	7.3	35.3		4.0	34.4	34.8	5.0	33.6	33.4	3.3	34.6	35.5
ND6925-13 Russ	10.5	34.8		9.8	10.0	34.5	9.5	11.0	31.0	7.5	17.3	33.8
ND6993-13 Russ	9.0	34.5		6.3	26.2	34.3	6.5	29.5	33.1	5.3	26.5	35.0
ND7103-4	7.8	35.0		6.1	35.5	35.3	6.8	33.5	33.2	4.0	27.6	36.0
ND7196-18	6.8	35.3		5.4	24.5	32.5	6.5	33.9	31.4	3.5	31.9	35.0
ND7642-3 Russ	9.3	33.8		9.5	15.0	34.0	8.5	10.9	31.0	8.5	15.4	33.8
ND7755-3 Russ	9.5	34.5		8.0	15.1	34.5	6.5	25.7	31.8	7.8	17.9	35.0
ND7761-33 Russ	9.3	37.0		8.3	16.3	33.0	8.0	19.4	34.0	7.0	20.4	34.0

1/ Color Chart - 1 = light 11 = dark

2/ Photovolt - higher numbers are lighter in color

3/ Yield - percent chip yield

North Dakota Table 3. 1972 cooking tests of varieties and selections grown at Grand Forks, North Dakota during 1971

	Boiling				Baking				
	Sloughing ^{1/}	Mealiness ^{2/}	Texture ^{3/}	Color ^{4/} After Cooking	Color 4 hrs. ^{5/} After Cooking	Mealiness	Texture	Color	Flavor ^{6/}
Chieftain	8.0	8.0	8.0	8.5	7.3	7.0	7.5	8.3	7.5
Cobbler	7.3	7.3	7.8	8.0	7.0	7.8	7.3	6.8	8.0
Kennebec	8.8	8.8	8.3	7.8	7.0	8.8	8.3	8.0	8.5
Monona	7.8	7.8	7.8	8.3	8.3	8.3	7.8	8.5	8.0
Norchief	7.8	7.8	7.5	9.0	7.5	8.0	7.8	8.0	8.0
Norchip	8.8	8.8	8.3	8.0	7.0	9.0	8.5	9.0	9.3
Norgold Russet	8.3	8.3	8.3	9.0	7.8	8.5	8.0	8.3	8.8
Norland	7.5	7.3	7.3	8.3	7.5	7.8	8.0	8.5	8.5
Red Pontiac	7.5	7.3	7.3	8.3	8.0	7.0	7.3	7.0	7.8
Russet Burbank	7.5	8.5	8.0	8.5	7.5	7.8	7.5	8.3	8.3
Viking	8.5	8.0	7.5	8.5	7.5	6.8	7.3	8.5	8.0
ND6634-2R	7.0	6.5	6.8	7.5	6.3	6.3	7.0	7.0	7.3
ND6647-1R	6.8	7.0	7.0	6.3	6.5	7.0	7.8	7.8	8.0
ND719-36R	7.0	7.3	7.0	8.5	7.0	6.5	6.8	7.8	7.5
ND6925-13 Russ	8.8	8.8	8.3	8.8	7.5	9.0	8.5	9.0	8.8
ND6993-13 Russ	8.5	8.5	8.0	7.8	7.0	8.5	8.0	7.5	8.3
ND7103-4	8.8	9.0	8.5	8.3	7.0	9.0	8.5	9.3	8.8
ND7196-18	7.0	8.8	8.0	8.3	7.5	8.3	7.3	8.3	8.3
ND7642-3 Russ	9.0	8.5	8.5	7.3	6.8	7.3	7.0	7.5	8.0
ND7688-3R	7.5	7.5	7.0	8.5	7.8	6.0	6.8	7.8	7.0
ND7755-3 Russ	8.0	8.3	7.8	8.3	8.0	8.3	7.3	8.0	8.8
ND7761-33 Russ	8.0	8.3	7.3	8.0	7.5	8.5	8.0	8.0	8.0
ND7824-1R	7.3	7.3	7.8	8.0	7.8	6.5	7.0	7.3	7.0

^{1/} 1 = severe sloughing, 10 = no sloughing

^{2/} 1 = not mealy, 10 = very dry and mealy

^{3/} 1 = poor texture, 10 = good texture

^{4/} 1 = dark color, 10 = very white color

^{5/} 1 = dark color, 10 = very white color

^{6/} 1 = poor flavor, 10 = good flavor

North Dakota Table 4. 1972 cooking tests of varieties and selections grown at Park River, North Dakota, during 1971

-161-

	Boiling				Baking				
	Sloughing ^{1/}	Mealiness ^{2/}	Texture ^{3/}	Color ^{4/} After Cooking	Color 4 hrs. ^{5/} After Cooking	Mealiness	Texture	Color	Flavor ^{6/}
Chieftain	7.8	7.0	7.3	9.0	8.0	7.0	7.5	8.0	8.0
Cobbler	7.3	7.5	7.8	8.0	7.3	7.5	6.3	6.0	6.8
Kennebec	9.3	9.3	8.5	8.3	7.8	9.3	7.5	9.0	9.0
Monona	8.3	8.3	8.0	8.5	8.0	6.8	7.0	7.0	7.3
Norchief	8.0	8.3	8.3	8.5	6.5	7.8	7.8	8.5	9.0
Norchip	8.8	9.5	9.3	8.3	7.3	9.0	8.5	8.8	9.3
Norgold Russet	9.3	9.3	8.8	9.5	9.0	9.3	9.0	9.5	9.3
Norland	7.5	8.0	8.0	8.5	7.0	8.0	8.3	8.3	8.8
Red Pontiac	7.0	6.8	7.3	8.8	7.8	6.8	6.8	7.8	8.0
Russet Burbank	8.8	9.0	8.8	8.5	7.8	8.5	7.8	7.8	8.0
Viking	7.0	7.8	6.5	9.3	9.3	7.3	7.0	7.5	8.5
ND6634-2R	6.5	6.3	6.5	7.8	7.5	7.0	6.5	6.5	7.8
ND6647-1R	6.8	6.8	7.3	8.0	7.5	6.8	7.0	7.3	8.0
ND6719-36R	8.0	8.5	8.0	9.0	7.5	6.8	7.0	7.5	7.8
ND6925-13 Russ	9.3	9.0	9.0	8.5	7.0	8.5	8.0	8.5	8.5
ND6993-13 Russ	8.5	9.0	8.5	8.0	7.0	9.0	8.3	7.5	8.5
ND7103-4	9.0	9.0	8.5	9.0	7.5	9.3	8.5	7.8	8.3
ND7196-18	8.8	8.8	8.5	8.5	7.5	9.0	8.5	8.8	9.5
ND7642-3 Russ	8.8	8.8	8.3	8.5	15.0	9.5	8.8	8.8	6.8
ND7688-3R	7.5	7.3	8.0	9.0	8.3	6.5	7.0	7.8	8.5
ND7755-3 Russ	8.5	8.8	8.3	8.3	7.8	8.3	8.0	8.0	7.8
ND7761-33 Russ	8.3	9.0	8.3	8.5	7.5	8.8	7.8	8.0	7.5
ND7824-1R	8.0	8.0	7.5	8.0	7.3	7.8	7.3	7.5	7.5

^{1/} 1 = severe sloughing, 10 = no sloughing^{2/} 1 = not mealy, 10 = very dry and mealy^{3/} 1 = poor texture, 10 = good texture^{4/} 1 = dark color, 10 = very white color^{5/} 1 = dark color, 10 = very white color^{6/} 1 = poor flavor, 10 = good flavor

North Dakota Table 5. Marketable yield and percent United States No. 1 of varieties and selections grown in state-wide potato trials--1972

	Grand Forks		Park River		Carrington				Minot		Williston		Average
	cwt/A		cwt/A	% US No.1	Irrig. cwt/A	% US No.1	Dryland cwt/A	% US No.1	cwt/A	% US No.1	cwt/A	% US No.1	
Kennebec	218		303	95	564	99	263	97	140	95	193	97	280
Red Pontiac	183		291	90	634	94	261	92	139	90	168	96	279
Chieftain	250		248	89	419	92	209	95	104	88	133	94	227
Viking	231		212	91	449	96	202	96	70	95	130	98	216
ND7196-18	198		181	78	451	87	222	84	68	88	148	91	211
Norchip	106		220	84	473	95	201	88	109	90	138	95	208
Norland	194		234	88	433	93	165	91	77	87	130	96	206
Norgold Russet	210		199	83	424	93	181	91	61	78	119	94	199
Russet Burbank	48		147	61	328	85	213	85	94	85	131	85	160
ND7103-4	125		191	89	320	97	122	88	53	78	97	95	151
ND6925-13 Russ	59		163	77	320	86	129	77	55	65	86	86	135
ND6634-2R	115		127	82	264	90	145	88	27	87	77	93	126
ND6647-1R	79		105	78	152	84	49	63	30	79	37	82	75
ND6647-4R	118		95	71	239	84	128	84	43	83	49	80	112
Cascade	132		260	90	451	94	253	94					274
ND8105-1R	115		140	55	313	86	162	85					183
ND7688-3R	53		129	83	264	87	136	87					146
D.T.6063-1R	171		192	91									182
ND8608-2	171		168	90									170
ND8243-4R	163		147	82									155
ND7878-1	109		178	80									144
ND8202-2R	106		168	85									137
ND8297-1	135		136	76									136
ND8243-11R	100		158	87									129
ND8168-6R	89		160	83									125
ND7710-5	118		115	77									117
Average	138		180		382		179		76		117		

North Dakota Table 6. Specific gravity^{1/} of varieties and selections grown in state-wide potato trials--1972

	Grand Forks	Park River	Carrington		Minot	Williston	Average
			Irrigation	Dryland			
Norchip	92	99	76	90	88	100	91
Kennebec	84	93	73	91	90	97	88
ND7196-18	91	92	73	84	87	93	87
ND6925-13 Russ	90	89	72	87	83	92	86
ND7103-4	96	97	72	86	76	91	86
Norgold Russet	89	93	71	84	83	90	85
Russet Burbank	75	87	79	88	86	94	85
Viking	84	91	72	81	82	89	83
Chieftain	84	88	69	82	78	80	80
ND6647-1R	82	86	72	80	72	79	79
ND6647-4R	81	86	70	83	77	77	79
ND7642-2 Russ	84	82	69	80	72	88	79
ND6634-2R	80	85	66	77	73	80	77
Norland	81	81	63	78	71	81	76
Red Pontiac	79	84	62	82	72	77	76
ND7642-3 Russ		82		79	81	90	83
ND7688-3R	81	77	67	76			75
ND8105-3R	73	77	62	73			71
D.T.6063-1R	92	93					93
ND8297-1	91	93					92
ND8202-2R	88	89					89
ND8243-4R	88	88					88
ND8608-2	87	86					87
ND8243-11R	84	87					86
ND7710-5	82	88					85
ND7878-1	79	87					83
ND8168-6R	67	73					70
Average	84	88	70	83	79	87	

^{1/} 1.0 omitted from specific gravity readings

OHIO

Floyd Lower, A. R. Mosley, E. C. Wittmeyer

Potato Variety Trials - 1972

The work was done under a cooperative arrangement between the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University, the Ohio Potato Growers Association and local growers. The purpose is to test promising new varieties under various farm practices and conditions.

Eight varieties were each planted in three replicates on each of seven Ohio farms. The plots could not be harvested on two of the farms because of the extremely wet fall. In addition to the main study on seven farms, ten varieties were planted in a similar manner on an eighth farm in southern Ohio for early market; and 28 selections were planted in small duplicated plots on two of the seven farms to find the most promising new cultivars for the main study the following year. This report concerns only the main study on the seven farms. The data in the tables are the averages of the five farms harvested.

Each plot consisted of two rows, in each of which 50 seedpieces were planted. Seed spacing varied from 9 to 11 inches in the row and 32 to 34 inches between rows. Each grower followed his usual field practices in planting, fertilization, culture, and spraying. Planting dates varied from May 2 to May 29. The seed was cut shortly before planting in each case and was dusted with polyram.

Fertilizer practices varied somewhat but were generally equivalent to about 1,000 to 1,400 pounds of 10-20-20 per acre with additional nitrogen plowed down on three of the seven farms. Farm one had a sandy loam while the other six farms had various types of silt loam.

Rainfall was adequate and in some cases excessive throughout the season except during late July and early August when it was somewhat deficient on some of the farms. Of the five farms prepared to irrigate, one applied water once and another twice during that period. It was extremely wet in late September and in October and November. On some of the farms, the amount of moisture during the growing season was about double the usual amount. In general, temperatures were below normal during the season. The prolonged periods of high temperature common to Ohio did not occur this year, except for one short period of but a few days.

Superior, Katahdin, and Kennebec were used as standard varieties with which to compare the new varieties. Very little virus disease of any kind was present in any of the varieties, except for some mosaic in Norchip. Vigor was generally good and in many cases very good. Less than one percent of fusarium and/or verticillium wilt was found in any of the plots on the two farms closely observed. A slight amount of surface scab and tuber rot was present in one or more replicates of several varieties.

A 50-pound sample of each variety was graded on a 1-7/8 inch screen to obtain the percentage of size B and cull tubers and to determine the marketable grade. The term "Marketable grade" would nearly meet the requirements of US#1. Specific gravity and chip tests were made at Ohio State University by Doctor Wilbur A. Gould, and will be reported separately. The tables summarize the average data for the five farms harvested, including stand, size, grade, and yield.

NY 41 led in average yield with Shurchip second and Abnaki third. This is exactly the same position these three varieties occupied in 1971.

Ohio Table 1. Summary of average yield and other data^{1/}, Ohio Potato Variety Trials---1972
(Listed in order of maturity)

Variety	Percent Stand	Weight of 40 Tubers, lbs.	Percent Size "B"	Percent Culls	Major Defects ^{2/}	Percent Marketable	Mkt. yield Cwt./Acre
Superior	85.2	13.9	5.05	6.53	ShGr	88.5	227.80
Haig (L)	88.2	13.9	6.24	5.36	Gr	88.4	289.40
Abnaki	79.5	18.2	2.72	5.14	ShGr	92.1	297.60
Shurchip	86.3	15.0	5.07	5.46	ShGr	89.4	305.00
Norchip	85.2	14.7	5.71	10.10	ShGrCr	84.4	283.80
Kennebec	85.1	18.4	3.40	15.91	ShGrCr	80.6	285.20
Katahdin	86.9	14.0	5.15	7.06	Gr	87.8	277.20
NY 41	84.3	15.5	4.10	8.20	GrSh	87.7	346.30
Average	85.1	15.6	4.65	7.83		87.5	290.00

^{1/} Not including farms No. 5 and 6 on which the plots could not be harvested.

^{2/} Sh-rough shape; Gr-sun greening; Cr-growth cracks; Sc-scab

Ohio Table 2. Average yields of marketable potatoes by variety and by farm in cwt. per acre
Ohio Potato Variety Trials--1972

Farm Number											
1		2		3		4		7		Average	
NY 41	422.45	NY 41	219.16	NY 41	373.82	NY 41	360.60	Shurchip	408.78	NY 41	352.14
Shurchip	389.79	Norchip	208.32	Haig (L)	293.44	Kennebec	309.23	Kennebec	404.78	Shurchip	304.72
Haig (L)	381.31	Abnaki	208.07	Katahdin	287.30	Shurchip	296.56	NY 41	384.67	Abnaki	297.67
Abnaki	378.34	Shurchip	201.96	Abnaki	271.46	Katahdin	291.21	Norchip	357.76	Haig (L)	289.54
Norchip	365.76	Haig (L)	189.37	Norchip	258.98	Abnaki	285.61	Abnaki	344.87	Norchip	285.67
Kennebec	326.77	Katahdin	178.71	Shurchip	226.51	Haig (L)	247.60	Haig (L)	335.98	Kennebec	285.18
Katahdin	305.36	Kennebec	165.75	Kennebec	219.38	Norchip	227.54	Katahdin	324.17	Katahdin	277.35
Superior	281.75	Superior	145.24	Superior	218.20	Superior	186.16	Superior	307.76	Superior	227.82
Average	356.44		189.57		268.65		275.56		358.60		290.01

Resistance to Potato Leafhoppers

J. P. Sleetman and L. L. Sanford

The leafhopper resistance of 94 clones was measured in a trial at the Ohio Agricultural Research and Development Center, Wooster, Ohio in 1972. The test was planted in an augmented, randomized, complete block design with six replications. The replicated clones (12) had been previously tested for leafhopper resistance, whereas the clones in single plots (82) were being tested for the first time.

A plot consisted of two 10-hill segments one of which had a systemic insecticide placed in the row at planting time (treated plot); the remaining 10-hill segment was left untreated. The plot segments were planted end-to-end in the row. Row spacing was 42 inches and seedpiece spacing was 12 inches.

Leafhopper infestation levels were measured by counting nymphs for 45 seconds on the untreated plot segments; five such counts were taken on each.

The differential effect of leafhoppers on yield was measured in two ways: 1) percentage yield loss relative to yield in treated plot segments; and 2) yield in untreated plots after adjustment for innate differences among the clones in yielding ability as estimated from the treated plot segments. The differences among the adjusted untreated plot yields are mostly due to leafhopper resistance and susceptibility.

The results of the trial are presented in Tables 1 and 2.

Table 1. Yield trial - Wooster, Ohio--1972 ^{1/}

Clone	Leafhopper Nymphs	Hopperburn		Total Yield Per Acre	
	Per 45 Sec. Count	Defoliation		Untreated Plots ^{2/}	Loss ^{3/}
	No.	July 18	Aug. 1	Adjusted	Pct.
		Pct.	Pct.	Cwt.	
B6558-2	1.1 a	2	10	339 bcdef	17
B5052-7	1.1 a	2	4	301 ef	23
B6936-4	1.1 a	3	5	358 abcde	6
B6936-5	1.7 ab	2	3	378 ab	12
B6553-15	1.7 ab	3	15	310 def	22
B6930-16	2.2 abc	8	37	369 abc	0
B5141-6	2.8 bc	3	6	335 cdef	19
B6990-12	3.1 bcd	3	12	365 abcd	4
B6930-1	4.1 cd	3	14	408 a	0
B6987-18	7.3 de	7	7	387 ab	4
Cobbler	8.1 e	24	63	289 f	27
B6955-25	12.5 e	21	50	313 cdef	20

^{1/} Clones replicated 6 times. Duncans multiple range test used, P = .05

^{2/} Adjusted for innate differences in clonal yielding abilities estimated from treated plots.

^{3/} Yield; treated plot - Yield untreated plot/Yield treated plot

Table 2. Yield trial - Wooster, Ohio--1972 ^{1/}

Clone	Leafhopper Nymphs	Hopperburn		Total Yield Per Acre	
	Per 45 Sec. Count	Defoliation		Untreated Plots ^{2/}	Loss ^{3/}
	No.	July 18	Aug. 1	Adjusted	Pct.
		Pct.	Pct.	Cwt.	
B7145-3	1.2	6	24	285	27
B7151-1	1.2	6	12	296	13
OB2905-1	1.4	12	24	258	32
OB5515	1.8	2	6	256	35
OB5516-3	1.8	2	2	201	48
B7139-4	2.0	6	12	290	29
B6929-14	2.1	2	12	234	38
BR7044-2	2.5	2	24	332	18
B7132-19	2.5	2	12	282	2
B7141-4	2.5	6	24	329	10
B7165-15	2.5	2	24	342	11
B7147-21	2.6	40	76	234	39
B7158-34	2.8	12	24	334	20
B7158-1	3.0	12	40	309	17
Erie	3.6	2	6	337	15
B7168-2	3.7	6	24	259	29
B3692-4	3.8	12	60	262	33
OB5516-6	3.9	2	2	381	0
B7167-14	3.9	12	60	240	37
B7132-1	4.1	2	12	328	21
B7147-10	4.4	12	12	276	22
B6929-1	4.6	24	40	264	31
B7196-4	4.6	12	60	284	0
B6516-5	4.7	6	6	376	0
B7132-22	4.7	12	24	272	31
B7196-20	4.7	12	60	287	0
B7188-37	4.9	40	88	285	0
B7165-2	5.6	6	24	324	24
B7181-21	5.6	40	60	222	42
B7134-3	6.1	40	60	325	15
B7167-2	6.1	2	24	259	31
B7188-45	6.1	24	76	253	26
B7130-22	6.2	6	6	402	0
B7024-6	6.4	2	12	330	15
B7139-6	6.4	2	6	298	17
B4829-7	6.8	40	60	336	20
OB5516-4	6.9	12	12	339	25
B7147-76	7.3	6	12	209	46
B7155-14	7.3	2	6	111	62
B7159-26	7.3	6	40	230	39
B6955-33	7.5	40	94	246	36
OB5516-5	7.7	6	12	341	1
B7147-40	7.7	24	76	244	26
B7147-7	7.9	12	24	243	35
B7132-26	8.1	12	12	372	0
B7164-25	8.3	12	12	471	0
B6516-18	8.5	12	40	356	8
B7152-1	8.8	6	40	279	32
B7132-29	9.2	40	76	242	36

Table 2. (Continued)

Clone	Leafhopper Nymphs	Hopperburn		Total Yield Per Acre	
	Per 45 Sec. Count	Defoliation		Untreated Plots ^{2/}	Loss ^{3/}
	No.	July 18	Aug. 1	Adjusted	Pct.
		Pct.	Pct.	Cwt.	
B7024-7	9.4	24	40	340	12
B7147-94	9.4	6	60	308	0
B7183-1	9.4	40	76	346	16
B7138-11	9.7	6	40	133	61
B3139-11	9.9	24	24	151	57
B7167-26	9.9	40	60	292	23
B7190-2	9.9	24	60	219	42
Chippewa	10.8	40	76	267	29
B6955-34	11.3	12	76	266	26
B6990-19	11.3	1	6	288	23
B7161-3	11.3	24	60	346	18
B7153-14	12.5	24	60	297	25
B7196-1	13.1	40	76	212	44
B7152-12	13.8	40	88	260	32
B7138-2	16.4	60	88	319	0
B7148-4	16.8	40	88	225	40
B7154-3	18.0	24	60	258	33
B7189-1	18.5	12	40	249	30
B6955-17	19.0	40	88	242	34
B7151-9	19.0	12	24	384	5
OB5526	19.4	6	24	314	27
B7153-1	21.4	40	60	235	39
B7165-8	21.9	12	40	244	38
B7149-6	22.4	24	76	164	51
B7139-15	23.0	60	94	228	36
B7147-28	23.0	60	88	299	0
B7152-8	23.0	60	88	272	27
B7169-8	23.6	60	98	205	46
B7155-3	24.1	60	94	252	36
B7136-5	24.7	24	94	319	5
B7196-36	24.7	60	98	235	35
B7153-30	31.4	60	98	125	64
B7196-40	59.3	60	94	377	15
LSD .05	4.4			177	

^{1/} Clones replicated once in augmented, randomized block design.

^{2/} Adjusted for innate differences in clonal yielding abilities estimated from treated plots.

^{3/} Yield; treated plot - Yield untreated plot/Yield treated plot

PENNSYLVANIA

Clarence S. Bryner

In 1972, Extension variety demonstrations were conducted in cooperation with county extension agents and potato growers in the following counties and regions: Potter county, north central region; Somerset county, southwestern region; York county, southeastern region; and Schuylkill, and Lehigh counties, east central region. Eleven varieties and three seedlings were evaluated for yield.

Cultural Information

<u>County</u>	<u>Grower</u>	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Planting to Harvest - Days</u>
Lehigh	R. Ringer	5/6	9/26	143
Potter	F. Irish	5/7	9/28	144
Schuylkill	E. Drescher	4/27	9/27	153
Somerset	R. & T. Croner	5/30	10/2	125
York	C. Flinchbaugh	4/28	9/21	146

All demonstrations were planted as randomized blocks with four replications. Cut seedpieces of each variety were hand planted in single 25-foot row plots, 9 inches apart within the row. Rows were 34 inches apart. Seedpieces of Norland were planted in 5-foot breaks between plots to identify the plots at harvest time. Total yields were recorded at harvest and tubers were graded for size over 1-7/8 inches.

Specific fertilizer recommendations at each location were made on the basis of soil-test results obtained from the University Soil Testing Laboratory.

Fertilizer applications were:

<u>County</u>	<u>Plow Down</u>	<u>Row</u>
Lehigh	4 tons poultry manure	800 lbs. 16-8-8
Potter		1300 lbs. 16-8-8
Schuylkill	700 lbs. 10-10-10	1500 lbs. 10-10-10 ^{1/}
Somerset	600 lbs. 15-15-15	1000 lbs. 10-20-20
York	10 tons cattle manure	1200 lbs. 10-5-5- 8% Mg

^{1/} In excess of recommendations

Specific Gravity Determinations and Chip Color Rating

Specific gravity was determined by the weight in air-and-water method. Single varietal samples were composited from four replications at each location.

Chip color ratings are an average of four fries made during the period 10/6/72 to 12/22/72 on potatoes stored at 70° F. Ratings are on a scale of 1 to 14 with 1 being white and 4 acceptable. Chips rating 5 are borderline in color.

The specific gravity determinations and chip color ratings were made by James Watts, Horticulturist, Wise Foods Division, Borden Foods, Incorporated, Berwick, Pennsylvania.

Pennsylvania Table 1, 2, 3. Yield, size distribution, specific gravity and chip color rating of potato varieties and seedlings in County Extension trials in 1972.

Variety	% Stand	Total Cwt./A	Yield 1/ 1 7/8" Up	Percentage			Specific Gravity 1.0+	Chip Color
				1 7/8"-2 1/4"	2 3/8" Up			
<u>Lehigh</u>								
Kennebec	95	334	324 a	27	73		827	4.0
Line 6RF-1	92	337	317 a	36	64		767	3.8
Cascade	95	333	312 a	43	57		884	3.8
Viking	91	274	271 b	13	87		791	3.5
B5141-6	95	282	268 b	36	64		991	1.8
Katahdin	98	276	267 b	29	71		822	3.0
Superior	92	251	242 bc	39	61		814	2.3
Penn 71	77	243	235 bcd	42	58		857	2.0
Line 6CX-6	94	238	224 cd	35	65		836	2.8
Chieftain	94	244	223 cd	52	48		712	4.0
Norchip	94	231	220 cd	35	65		848	3.0
Norland	100	209	198 d	55	45		645	3.8
Peconic	92	205	183 de	53	47		851	2.0
Monona	76	159	150 e	47	53		781	1.5
<u>Potter</u>								
Cascade	92	379	357 a	22	78		839	6.0
Kennebec	89	334	324 ab	14	86		902	4.8
Line 6RF-1	89	328	316 ab	12	88		817	6.0
Viking	97	321	315 ab	5	95		813	7.0
Penn 71	84	323	313 ab	13	87		832	4.0
Katahdin	95	307	294 b	23	77		902	5.0
Chieftain	77	294	284 bc	15	85		792	6.5
Line 6CX-6	95	294	272 bcd	21	79		959	3.3
Superior	89	279	269 bcd	19	81		870	4.5
Norchip	91	241	229 cde	18	82		962	2.5
B5141-6	92	243	215 de	37	63		975	2.8
Monona	76	196	185 ef	21	79		825	2.0
Norland	89	195	183 ef	26	74		755	5.0
Peconic	91	169	153 f	30	70		847	4.8
<u>Schuylkill</u>								
Cascade	95	377	341 a	36	64		803	4.3
Line 6RF-1	95	341	306 ab	35	65		789	4.0
Kennebec	93	324	302 abc	27	73		789	2.5
Chieftain	98	327	291 bcd	44	56		660	3.8
Norchip	95	290	266 bcde	36	64		822	3.3
Superior	94	288	265 bcde	33	67		765	3.3
Line 6CX-6	95	283	259 cde	36	64		885	2.0
Viking	92	265	253 de	25	75		748	4.5
Penn 71	88	269	247 de	28	72		782	2.0
Katahdin	92	256	233 ef	39	61		757	3.0
B5141-6	89	253	229 ef	36	64		984	2.0
Norland	97	231	197 f	54	46		602	3.8
Monona	92	159	140 g	53	47		676	1.8
Peconic 2/	64	128	115 g	42	58		870	2.8

2/ Seedpieces infected with Fusarium after cutting.

1/ Yield differences at .05 level, Duncan's Modified (Bayesian) L. S. D. test.

Pennsylvania Table 4, 5, 6. Yield, size distribution, specific gravity and chip color rating of potato varieties and seedlings in County Extension trials in 1972.

Variety	Stand %	Total Cwt./A	Yield 1/ 1 7/8" Up	Percentage			Specific Gravity 1.0+	Chip Color
				1 7/8"-2 1/4"	2 3/8" Up			
<u>Somerset</u>								
Cascade	92	369	351 a	15	85		744	5.8
Line 6KF-1	81 ^{1/2}	345	326 ab	19	81		833	3.3
Kennebec	94	338	320 abc	17	83		857	2.8
Penn 71	94	304	289 bcd	19	81		791	2.3
Peconic	98	301	266 cde	37	63		894	1.5
Line 6CX-6	97	276	256 def	25	75		949	2.0
Chieftain	77	253	244 def	10	90		754	5.3
Katahdin	89	256	241 def	23	77		790	3.5
Viking	96	247	240 def	11	89		792	4.5
Superior	93	245	223 efg	20	80		791	2.3
B5141-6	84	243	218 efg	30	70		1046	2.3
Norchip	75	217	201 fg	20	80		847	2.5
Monona	88	185	170 g	24	76		792	1.5
Norland	95	118	95 h	47	53		658	3.8

<u>York</u>								
Cascade	95	433	383 a	37	63		879	4.8
Line 6RF-1	97	401	346 ab	41	59		857	3.8
Viking	94	342	332 bc	17	83		768	3.8
Kennebec	97	360	330 bc	28	72		847	3.3
Penn 71	86	326	301 cd	35	65		794	2.0
Superior	96	320	300 cd	25	75		737	2.8
B5141-6	93	322	293 cde	32	68		1027	2.0
Katahdin	95	305	281 def	25	75		770	3.5
Norchip	93	291	267 def	30	70		814	3.5
Line 6CX-6	96	287	251 ef	37	63		927	2.5
Chieftain	97	296	246 fg	45	55		701	3.8
Norland	98	235	204 gh	44	56		599	4.0
Monona	86	199	175 hi	36	64		722	2.3
Peconic 2/	55	166	156 i	22	78		823	2.5

2/ Seedpieces infected with Fusarium after cutting.

<u>Five County Average</u>								
Cascade	94	378	349 a	31	69		830	4.9
Line 6RF-1	91	350	322 b	29	71		813	4.2
Kennebec	94	338	320 b	23	77		844	3.5
Viking	94	290	282 c	14	86		782	4.7
Penn 71	86	293	277 cd	27	73		811	2.5
Katahdin	94	280	263 de	28	72		808	3.6
Superior	93	277	260 de	28	72		795	3.0
Chieftain	89	283	258 e	33	67		724	4.7
Line 6CX-6	96	276	252 ef	31	69		911	2.5
B5141-6	91	269	244 ef	34	66		1004	2.2
Norchip	89	254	237 f	28	72		859	3.0
Peconic	80	194	183 g	37	63		857	2.7
Norland	96	198	175 g	45	55		652	4.1
Monona	84	180	164 g	36	64		759	1.8

1/ Yield differences at .05 level, Duncan's Modified (Bayesian) L. S. D. test.

PENNSYLVANIA

J. D. Harrington, F. J. McArdle, and R. B. Beelman

Potato variety trials were conducted at the Agronomy Research Farm near Rock Springs in Centre County (central) and at the Henry G. Shenk Farm near Manheim in Lancaster County (southeast) in 1972.

Soils at the experimental sites were deep, heavy, well-drained and slightly acidic in pH. Prior to varietal hand planting, rows were furrowed-out three feet apart and simultaneously treated with systemic insecticide and commercial fertilizer. The Centre County site received N, P_2O_5 , and K_2O totaling 210-140-140 lb/A, and the Lancaster County site received 180-90-90 lb/A.

Seed for 20 varieties and seedling numbers were Maine grown and obtained from either the United States Department of Agriculture or the Maine Department of Agriculture. Seed of Penn 71, 6CX6, and 6RF1 were obtained in Pennsylvania. Seedpieces (four-cut) were planted nine inches apart within 25-foot single-row plots, with a three-foot break between plots. A randomized block design with four replications for each of the three maturity groups (early, medium, and late) was employed. Planting in Centre County was done on May 1; planting in Lancaster County on April 28.

Varieties were mechanically harvested with a "Braco" single-row harvester and bagger attachment on October 4 (156 days after planting) in Centre County and on September 19 (144 days after planting) in Lancaster County. In both Centre and Lancaster counties an extremely wet spring and dry summer characterized the growing season. Average night and day temperatures were lower in Centre County than in Lancaster County.

Production and Quality Indices. Varietal maturity, tuber production, and tuber quality indices were obtained as follows:

Maturity--final grouping determined by percent vegetative tops naturally dead 119 and 133 days after planting in Centre County and 116 days after planting in Lancaster County.

Percent stand--based on the total number of plants emerged about 38 days after planting.

Total yield, cwt/A--tubers $1\frac{1}{2}$ inches in diameter and larger were harvested from plots, weighed, and total plot weights converted to hundredweight yields per acre.

Percent of total yield $1\frac{7}{8}$ to 4 inches in size and $2\frac{1}{4}$ to 4 inches in size--harvested tubers from each plot were graded and grouped into the two size distribution classes. Size A (round or intermediate varieties) included potatoes of $1\frac{7}{8}$ inches minimum in size with 60 percent or more $2\frac{1}{4}$ inches and larger.

Specific gravity--determined from approximately eight-pound tuber samples by the air-and-water method.

Percent total solids--values obtained directly from specific gravity readings by employing the conversion table reported by G. V. C. Houghland.

Chip yield, lb/100 lb--an estimate of the pounds of chips obtained from 100 pounds of raw peeled potatoes. Eight-ounce samples of peeled, washed 1/16-inch slices sliced when raw and fried were used to obtain chip yield.

Chip color, Rd--determined with the Gardner Color Difference Meter. Instrument was standardized against color standard C-LY-1047-57. Rd (reflectance) values 20.0 and above may be considered acceptable for marketing.

All tuber-quality indices were determined within 52 days after harvest at the Department of Horticulture's Food Processing Laboratory. Tubers were stored in dry barns until grading and chipping without facilities for control of temperature or humidity.

Centre County Trials (central)

Summarized highlights of the research results in Centre County were as follows:

The 10 late-maturing varieties averaged highest in total yields per acre, 243 cwt, whereas the seven medium- and six early-maturing varieties averaged 220 and 208 cwt, respectively. Late-maturing varieties produced tubers highest in specific gravity, 1.097, but chips dark in color, 14.9 Rd 34 days after harvest. Tuber specific gravity of medium- and early-maturing varieties was 1.088 and 1.085, whereas chip color was 13.9 and 15.6 Rd, respectively. Highest total yields per acre of early-, medium-, and late-maturing varieties were obtained for B6974-2 (236 cwt), Abnaki (262 cwt), and BR6316-5 (298 cwt). Lowest yields per acre were produced by B6987-43 (166 cwt), Wauseon (179 cwt), and BR5957-7 (183 cwt).

Of the 23 varieties, only Seminole produced 60 percent or more of the total yield $2\frac{1}{4}$ inches or larger in size thus meeting the past minimum requirement for Size A potatoes.

Varieties with the highest percentage of the total yield $2\frac{1}{4}$ inches or larger in size for each maturity group were Seminole (68%), B6974-10 (51%), and BR6316-5 (56%). Varieties producing the lowest total yield $2\frac{1}{4}$ inches or larger in size were B7196-18 (27%), Norchip (35%), and Peconic (33%).

Varieties showing high specific gravity and solids content produced high yields of chips. Varieties of low specific gravity produced fewer pounds of chips per 100 pounds of potatoes.

Highest specific gravity tubers for each maturity group were as follows: Seminole, 1.098; Norchip, 1.097; and B6097-9, 1.106. Lowest specific gravity varieties were B6974-2, 1.062; B6974-10, 1.073; and BR5957-7, 1.089. Of these six varieties, chip color did not appear commercially acceptable.

Of the 23 varieties, only Monona produced chips sufficiently light in color (20.0 Rd and higher) after harvest to be considered commercially acceptable.

Varieties which produced chips lightest in color for each maturity group were Monona, Norchip, and BR6316-5. Varieties which produced the darkest colored chips were B6974-2, B6974-10, and Cascade.

Lancaster County Trials (southeast)

Summarized highlights of the research results in Lancaster County were as follows:

The six early-maturing varieties averaged highest in total yields per acre, 239 cwt, whereas the seven medium- and 10 late-maturing varieties averaged 198 and 188 cwt, respectively. Late-maturing varieties produced tubers highest in specific gravity, 1.078, but chips dark in color, 15.7, Rd 51 days after harvest. Tuber specific gravity of early- and medium-maturing varieties was 1.070 and 1.069, whereas chip color was 13.1 and 12.0 Rd, respectively.

Highest total yields per acre of early-, medium-, and late-maturing varieties were obtained for BR6306-22 (310 cwt), Norchip (232 cwt), and BR6316-5 (240 cwt). Lowest yields per acre were produced by B7196-18 (202 cwt), Wauseon (163 cwt), and 6RF1 (124 cwt).

Of the twenty-three varieties, only Seminole produced 60 percent or more of the total yield $2\frac{1}{4}$ inches or larger in size thus meeting the past minimum requirement for Size A potatoes.

Varieties with the highest percentage of the total yield $2\frac{1}{4}$ inches or larger in size for each maturity group were Seminole (62%), Abnaki and Norchip (52%), and Penn 71 (48%). Varieties producing the lowest total yield $2\frac{1}{4}$ inches or larger in size were B7196-18 (24%), B6930-7 (33%), and Cascade (30%).

Varieties showing high specific gravity and solids content produced high yields of chips. Varieties of low specific gravity produced fewer pounds of chips per 100 pounds of potatoes.

Highest specific gravity tubers for each maturity group were as follows: Seminole, 1.081; Norchip, 1.078; and B6097-9, 1.092. Lowest specific gravity varieties were B6974-2, 1.042; B6974-10, 1.044; and Katahdin, 1.065. Of these six varieties, chip color did not appear commercially acceptable.

None of the twenty-three varieties produced chips sufficiently light in color (20.0 Rd and higher) after harvest to be considered commercially acceptable.

Varieties which produced chips lightest in color for each maturity group were Monona, B6987-18, and 6RF1. Varieties which produced the darkest colored chips were B6974-2, B6974-10, and BR5957-7.

Pennsylvania Table 1. Production and tuber quality indices of potato varieties grown at two locations in Pennsylvania, 1972.

CENTRE COUNTY (central)									
VARIETY or SEEDLING	-----PRODUCTION INDICES-----					-----QUALITY & CHIP INDICES----- ^{1/}			
	Origin	Stand, %	Total yield, cwt/A	% of yeild,		Spec. grav.	Solids, %	Chip yld., lb/100 lb	Chip Color, Rd
				1-7/8" to 4"	2-1/4" to 4"				
<u>EARLY MATURITY</u>									
B6974-2	USDA	88	236	82	54	1.062	17.8	26.7	8.8
BR6306-22	USDA	92	233	76	38	1.078	20.9	30.0	12.3
Seminole	Pri. (F-L)	96	223	91	68	1.098	24.4	35.0	16.6
B7196-18	USDA	99	216	66	27	1.090	22.9	33.3	18.6
Monona	Pri. (F-L)	97	176	64	33	1.084	21.8	30.1	21.2
B6987-43	USDA	93	166	86	56	1.096	24.2	32.9	16.2
L.S.D. (.05)		6	NS	11	11	0.006	1.1	2.2	3.5
C.V., %		4.3	17.1	9.6	15.5	0.4	3.3	4.6	15.0
<u>MEDIUM MATURITY</u>									
Abnaki	USDA, NY., ME.	97	262	85	50	1.089	22.8	31.2	11.6
B6974-10	USDA	95	248	82	51	1.073	19.9	26.2	9.4
B6930-7	USDA	92	238	79	45	1.088	22.5	31.8	12.0
Norchip	N.D.	96	215	72	35	1.097	24.2	33.8	18.1
B6932-9	USDA	87	210	80	50	1.092	23.3	31.5	12.6
B6987-18	USDA	86	185	79	47	1.091	23.2	31.4	15.8
Wauseon	USDA, N.Y.	96	179	76	40	1.088	22.5	31.3	17.8
L.S.D. (.05)		5	38	7	10	0.005	0.9	2.6	3.9
C.V., %		4.0	11.6	5.9	14.8	0.3	2.7	5.6	19.0

Pennsylvania Table 1. (Continued)

CENTRE COUNTY (central)

-----PRODUCTION INDICES-----
-----QUALITY & CHIP INDICES^{1/}-----

VARIETY or SEEDLING	Origin	Stand, %	Total yield, cwt/A	% of yield, 1-7/8" to 4"	% of yield, 2-1/4" to 4"	Spec. grav.	Solids, %	Chip yld., lb/100 lb.	Chip Color, Rd
<u>LATE MATURITY</u>									
BR6316-5	USDA	94	298	85	56	1.103	25.4	33.8	17.8
Kennebec	USDA	98	288	80	47	1.096	24.2	33.4	12.0
Cascade	USDA, Wash.	96	279	76	42	1.096	24.1	32.6	10.8
6RF1	Pa.	95	262	84	55	1.097	24.3	33.8	13.6
6CX6	Pa.	98	246	82	46	1.102	25.2	34.2	16.2
Penn 71	Pa.	86	245	84	51	1.093	23.5	32.4	15.7
Katahdin	USDA	96	230	80	47	1.093	23.5	33.6	15.7
Peconic	N.Y.	91	203	72	33	1.097	24.3	34.2	14.2
B6097-9	USDA	94	192	64	36	1.106	25.9	35.5	15.7
BR5957-7	USDA	90	183	76	44	1.089	22.8	32.3	17.2
L.S.D. (.05)		7	59	5	9	0.004	0.8	NS	3.0
C.V., %		5.1	16.8	4.7	14.1	0.3	2.4	4.5	13.9

^{1/} Specific gravity determined 10/24; chipped 11/7, 34 days after harvest

Pennsylvania Table 1. (Continued)

LANCASTER COUNTY (southeast)

VARIETY or SEEDLING	Origin	-----PRODUCTION INDICES-----				-----QUALITY & CHIP INDICES $\frac{2}{\text{lb}}$ -----			
		Stand, %	Total yield, cwt/A	% of yield, 1-7/8" to 4"	2-1/4" to 4"	Spec. grav.	Solids, %	Chip yld., lb/100 lb.	Chip Color, Rd
<u>EARLY MATURITY</u>									
BR6306-22	USDA	95	310	84	48	1.069	19.0	27.8	10.4
B6987-43	USDA	98	242	86	56	1.079	21.0	27.9	13.3
Monona	Pri. (F-L)	99	238	82	42	1.068	18.9	26.9	18.7
B6974-2	USDA	84	228	82	52	1.042	14.0	22.9	6.8
Seminole	Pri. (F-L)	98	214	88	62	1.081	21.4	30.3	12.3
B7196-18	USDA	94	202	67	24	1.078	20.8	30.2	17.0
L.S.D. (.05)									
C.V., %		6 4.3	39 10.7	6 5.2	6 8.3	0.004 0.2	0.7 2.3	1.8 4.4	2.5 12.6
<u>MEDIUM MATURITY</u>									
Norchip	N.D.	95	232	85	52	1.078	20.7	30.5	14.1
Abnaki	USDA, N.Y., ME.	97	221	86	52	1.076	20.5	29.3	10.4
B6974-10	USDA	94	201	76	42	1.044	14.4	22.0	6.6
B6987-18	USDA	93	201	82	44	1.076	20.4	28.4	17.2
B6932-9	USDA	90	186	76	41	1.070	19.3	28.6	10.4
B6930-7	USDA	94	180	68	33	1.065	18.3	28.8	12.2
Wauseon	USDA, N.Y.	91	163	72	37	1.071	19.5	26.6	12.7
L.S.D. (.05)									
C.V., %		NS 4.5	NS 15.7	12 10.0	NS 24.0	0.006 0.4	1.2 4.3	2.0 4.8	3.3 18.7

Pennsylvania Table 1. (Continued)

LANCASTER COUNTY (southeast)

-----QUALITY & CHIP INDICES 2/-----

-----PRODUCTION INDICES-----

VARIETY or SEEDLING	Origin	Stand, %	Total yield, cwt/A	% of yield, 1-7/8" to 4"	% of yield, 2-1/4" to 4"	Spec. grav.	Solids, %	Chip yld., lb/100 lb.	Chip Color, Rd
<u>LATE MATURITY</u>									
BR6316-5	USDA	98	240	78	35	1.088	22.6	32.0	16.2
Penn 71	Pa.	94	223	83	48	1.073	19.8	28.3	15.0
Cascade	USDA, WASH.	94	210	66	30	1.079	21.0	30.4	15.6
Kennebec	USDA	97	205	73	38	1.080	21.1	30.3	18.0
Peconic	N.Y.	96	191	73	32	1.077	20.6	29.1	14.0
6CX6	Pa.	98	186	75	36	1.081	21.3	29.1	16.1
B6097-9	USDA	88	177	58	31	1.092	23.2	31.7	15.7
Katahdin	USDA	92	166	69	38	1.065	18.3	26.8	14.7
BR5957-7	USDA	86	159	72	40	1.066	18.6	27.8	13.5
6RF1	Pa.	90	124	57	33	1.075	20.2	26.6	18.3
L.S.D. (.05)		8	35	8	7	0.004	0.8	1.9	NS
C.V., %		5.9	12.9	7.9	13.4	0.3	2.7	4.4	19.8

2/ Specific gravity determined 10/25; chipped 11/9, 51 days after harvest

SOUTH CAROLINA

W. R. Sitterly

Irish Potato Variety Trials (Spring 1972)

Purpose: To obtain varieties suitable to coastal South Carolina.

Procedure: On February 14, field F-10 (sandy loam) was sprayed with 3 lbs./A of Parathion for wireworm control, fertilized with 1000 lbs/A of granular 10-10-10 and bedded. On February 22, beds were opened, seedpieces planted according to a randomized block design, the area sprayed with 3 lbs/A of Eptam, and re-bedded. Plot size was 1/300 A. On March 20 the area was dragged, and again bedded. The test was harvested June 2.

I. Replicated Variety Trial

Results: B6597-20, Alamo, LaChipper, and Superior had the best external tuber appearance in this test.

South Carolina Table 1. Horticultural characteristics of varieties in the Irish potato yield trials (Spring 1972).

Variety	Yield (cwt/A)	D.M. (%)	Maturity	Remarks
B6597-20	140	16.1	ME	Susceptible early blight, ozone Susceptible ozone Internal brown flecks on 80% of tubers
B6987-22	132	19.6	ML	
B7012-17	156	17.8	E	
Alamo	168	17.0	ME	
LaChipper	188	19.0	ME	
Penobscot	180	20.3	ML	
Superior	108	18.7	ME	
LSD ₅	92	2.0		

As shown in Table 1, no significant yield differences occurred; and no variety produced a higher yield than the LaChipper control.

Although all the DM contents, except B6597-20, were very good, no item produced a significantly greater amount of DM than the LaChipper standard as shown in Table 1.

B6987-22 was too late for South Carolina.

B6597-20 and LaChipper were susceptible to ozone.

Conclusion: In this test the presently recommended LaChipper standard was the best performing variety in the trial. The only minus factor to this item was the apparent susceptibility to ozone.

II. Observational Trial

Results and Conclusions: Line B6692-9 had the best external tuber appearance in this test.

As shown in Table 2, B6518-8 had the highest yield in the test. Lines B6712-9 and B6097-9 also had excellent yields. Line B7151-1 had the highest DM content, followed by B6595-12, B6516-5, and B6712-17. The most frequent defects were internal browning and susceptibility to early blight. Items to be advanced to replicated yield trial are B6712-9 and B6097-9.

South Carolina Table 2. Horticultural characteristics of items in the Irish potato observational trials (Spring 1972).

Entry	Yield (cwt/A)	Maturity	D.M. (%)	Remarks
B4784-1	142	ME	15.8	40% internal browning
B5282-12	115	ME	18.2	
B5647-8	93	L	16.8	
B6097-9	168	ML	19.3	10% internal browning
BR6320-1	123	L	17.8	Susceptible early blight
B6516-5	90	ME	20.0	
B6516-15	126	E	18.3	
B6518-8	190	L	19.4	50% internal browning
B6558-16	123	L	18.7	Susceptible to ozone
B6595-12	90	E	20.0	Susceptible to early blight
B6692-9	150	E	19.1	
B6712-9	174	ME	18.2	
B6712-17	57	E	19.9	30% internal browning
B6761-12	90	ML	15.4	All stalk and no leaves
B6815-14	162	L	16.0	50% growth cracks, 20% hollow heart
B6815-19	141	L	17.0	10% hollow heart, 10% internal browning
B6928-8	153	L	17.8	40% internal browning
B6929-10	138	ML	19.4	
B6951-1	132	ML	17.0	
B6968-3	147	ML	16.5	Susceptible to ozone
B6969-1	105	L	17.1	20% internal browning, skin cracks
B7132-25	87	E	18.7	70% internal browning
B7151-1	123	ML	22.0	
B7151-7	120	L	19.3	Skin cracks
B7153-30	111	L	18.1	Susceptible early blight
B7155-65	102	E	17.6	Susceptible early blight
B7157-11	57	ME	16.1	Susceptible to ozone. Poor flesh
B7163-8	72	L	18.6	Susceptible early blight
B7167-9	96	E	18.6	

TEXAS

R. D. Peel ^{1/}, S. B. Norrell ^{1/}, C. E. Cunningham ^{2/}

Cooperative Testing of Potato Varieties for Use in Soups. Potato variety trials were grown in replicated tests in five (5) locations in Texas in 1972: Pearsall (south central Texas); Castroville (south central Texas); Munday (north central Texas); Hereford (northwest Texas); and Hart (northwest Texas).

Pearsall (Frio County). Only one (1) of the numbered varieties outyielded the standard variety Kennebec although only two (2) were lower in yield. Many of the new varieties were higher in specific gravity and had an overall higher rating than Kennebec. (Table 1)

Castroville (Medina County). Four (4) of the numbered varieties were higher yielding, eight (8) were lower yielding and eight (8) produced the same yield as the standard variety, Kennebec. Thirteen (13) of the new varieties were higher in specific gravity and only two (2) were lower than the standard. All but four (4) of the numbered varieties had a higher overall tuber rating than Kennebec. (Table 2)

Munday (Knox County). Only one (1) variety was higher yielding than Kennebec at this location. This was BR-6863-1E, which was also the high yielder at Castroville. Only four (4) numbered varieties were higher in specific gravity than Kennebec. These were the two (2) highest yielders and the two (2) lowest yielders. Fifteen (15) of the new varieties received a higher overall rating than the standard. (Table 3)

Hereford (Deaf Smith County). None of the new varieties were significantly higher in yield than Kennebec at this location, and thirteen (13) were lower in yield. Eleven (11) numbered varieties were higher in specific gravity, and nineteen (19) had a higher overall tuber rating than the standard, Kennebec. (Table 4)

Hart (Hale County). Excellent yields and grades were recorded at this location, but none of the new varieties outyielded the standard. Nine (9) of the numbered varieties were lower yielding than Kennebec, but thirteen (13) were higher in specific gravity. All but five (5) of the new varieties had higher overall tuber ratings, and those five (5) had the same rating as the standard. (Table 5)

^{1/} Campbell Institute for Agricultural Research, Paris, Texas

^{2/} Campbell Institute for Agricultural Research, Riverton, New Jersey

Texas Table 1 - Total, % No. 1, specific gravity and overall rating of varieties grown at Pearsall, Texas, 1972.

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating ^{1/}
BR-5960-5 ^{2/}	259	87	1.054	3.0
BR-6491-5	219	80	1.064	3.5
BR-7108-1	217	88	1.061	3.0
Norchip	213	82	1.059	2.5
BR-6463-2	209	83	1.062	3.5
BR-6863-7	204	81	1.062	3.0
BR-6863-8E	203	82	1.064	2.5
BR-6446-2	199	79	1.053	3.0
BR-6863-1E	198	79	1.061	2.5
BR-6862-5E	193	76	1.057	3.0
Kennebec	188	80	1.053	2.5
BR-6820-26	183	74	1.050	2.5
BR-6626-5	182	70	1.053	3.0
Alamo	177	80	1.051	3.0
BR-7085-1	176	75	1.063	3.5
BR-6864-6E	175	85	1.051	2.5
BR-7066-1	174	75	1.044	2.5
BR-5960-13	171	87	1.063	3.0
BR-6491-1	170	83	1.064	3.0
BR-6864-9	156	75	1.046	3.0
BR-6859-3	153	80	1.053	3.0
BR-6863-3	152	81	1.062	3.0
BR-6864-11E	142	69	1.047	2.5
BR-7093-6	139	83	1.049	3.0
L.S.D. .05	41	8	0.004	
c.v.	15.6	7.4	0.250	

^{1/} 1 = Poor to 5 = Excellent

^{2/} BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - February 9, 1972

Harvest date - May 31, 1972

Row spacing - 36 inches

Plant spacing - 12 inches

Plot size - 2 rows, 12 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 700# 16-20-6

Texas Table 2 - Total, % No. 1, specific gravity and overall rating of varieties grown at Castroville, Texas, 1972.

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating <u>1/</u>
BR-6863-1E <u>2/</u>	217	86	1.080	3.0
BR-5960-5	215	95	1.074	3.0
BR-7108-1	215	91	1.079	3.5
BR-6862-5E	214	85	1.072	2.5
BR-6463-2	209	88	1.075	4.0
BR-7085-1	206	89	1.077	3.5
BR-6820-26	194	85	1.065	3.0
BR-6446-2	194	92	1.063	2.5
BR-7066-1	190	89	1.058	3.0
Norchip	186	89	1.068	2.5
Kennebec	181	88	1.066	2.5
BR-6491-5	177	89	1.083	3.0
Alamo	172	92	1.060	3.5
BR-6863-7	170	90	1.078	3.0
BR-6863-8E	163	95	1.077	2.5
BR-6864-9	158	92	1.068	3.5
BR-6491-1	149	93	1.078	3.0
BR-5960-13	141	90	1.072	3.0
BR-6863-3	138	93	1.075	3.0
BR-6864-11E	135	84	1.066	3.0
BR-6864-6E	135	91	1.065	3.0
BR-6626-5	133	81	1.073	2.5
BR-6859-3	121	94	1.066	3.0
BR-7093-6	116	88	1.057	3.5
L.S.D. .05	29	7	0.004	
c.v.	12.0	5.4	0.264	

1/ 1 = Poor to 5 = Excellent

2/ BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - February 26, 1972

Harvest date - June 13, 1972

Row spacing - 36 inches

Plant spacing - 12 inches

Plot size - 2 rows, 12 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 300# 18-18-10 Broadcast

200# 8-16-8 At Planting

Texas Table 3 - Total, % No. 1, specific gravity and overall rating of varieties grown at the Texas A & M Center, Munday, Texas, 1972

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating ^{1/}
BR-6863-1E ^{2/}	266	83	1.086	2.5
BR-6863-8E	232	85	1.084	2.5
BR-5960-5	214	91	1.075	3.0
BR-6864-11E	211	81	1.071	3.0
BR-6820-26	210	91	1.077	3.0
BR-7108-1	208	91	1.081	2.5
BR-6863-7	203	82	1.079	2.5
Norchip	185	74	1.080	2.5
Kennebec	184	88	1.078	2.5
BR-6463-2	178	77	1.080	3.0
BR-5960-13	177	87	1.080	2.5
BR-6864-9	172	87	1.074	3.0
BR-6862-5E	166	72	1.076	2.5
Alamo	162	89	1.071	3.5
BR-6859-3	158	92	1.071	3.0
BR-6626-5	153	72	1.075	3.0
Norgold Russet	147	77	1.071	3.0
BR-6864-6E	146	84	1.070	3.0
BR-6491-5	146	71	1.084	3.0
BR-7066-1	143	81	1.067	3.0
BR-6446-2	141	88	1.069	3.0
BR-6491-1	129	88	1.079	3.0
BR-6863-3	126	82	1.083	3.0
BR-7085-1	124	84	1.084	3.0
BR-7093-6	86	77	1.069	3.0
L.S.D. .05	52	8	0.005	
c.v.	21.8	7.0	0.322	

^{1/} 1 = Poor to 5 = Excellent

^{2/} BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - February 18, 1972

Harvest date - June 19, 1972

Row spacing - 40 inches

Plant spacing - 12 inches

Plot size - 1 row, 24 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 300# Ammonium Sulfate + 200# 16-20-6

Texas Table 4 - Total, % No. 1, specific gravity and overall rating of varieties grown at Hereford, Texas, 1972

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating ^{1/}
BR-6863-1E ^{2/}	360	88	1.087	2.5
Kennebec	348	94	1.073	2.0
BR-5960-5	346	96	1.081	2.0
BR-6863-8E	331	92	1.086	3.0
BR-5960-13	323	96	1.087	2.0
BR-6864-11E	321	90	1.073	3.0
Norchip	296	89	1.079	2.5
BR-6463-2	290	90	1.077	3.0
BR-6626-5	282	91	1.081	3.0
BR-6820-26	270	88	1.073	3.0
BR-6446-2	256	94	1.070	3.0
Norgold Russet	252	85	1.077	3.0
Alamo	252	85	1.067	2.5
BR-6863-7	251	83	1.078	3.0
BR-6862-5E	234	88	1.072	2.5
BR-6864-9	230	88	1.072	3.0
BR-6491-5	218	85	1.087	2.5
BR-7108-1	213	91	1.085	3.0
BR-6864-6E	212	88	1.070	3.0
BR-7066-1	211	92	1.069	2.5
BR-6863-3	190	92	1.084	3.0
BR-6859-3	178	86	1.066	2.5
BR-6491-1	169	89	1.084	3.0
BR-7085-1	169	85	1.088	2.5
BR-7093-6	145	87	1.070	2.5
L.S.D. .05	84	5	0.005	
c.v.	23.5	4.3	0.227	

^{1/} 1 = Poor to 5 = Excellent

^{2/} BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - March 27, 1972

Harvest date - August 2, 1972

Row spacing - 40 inches

Plant spacing - 9 inches

Plot size - 1 row, 24 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 800# 10-10-10 + 40# N Sidedress

Texas Table 5 - Total, % No. 1, specific gravity and overall rating of varieties grown at Hart, Texas, 1972.

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating ^{1/}
Norchip	394	93	1.076	3.0
BR-7066-1 ^{2/}	383	95	1.064	3.0
BR-6863-8E	380	86	1.084	3.0
Kennebec	357	93	1.070	2.5
BR-6626-5	351	93	1.075	3.0
Alamo	340	92	1.061	3.5
BR-7085-1	335	93	1.085	3.0
BR-6446-2	328	95	1.066	3.0
BR-7108-1	321	96	1.081	3.0
BR-6864-6E	313	91	1.065	3.0
BR-6463-2	305	92	1.076	3.0
BR-5960-5	304	95	1.076	2.5
BR-6491-5	301	90	1.082	3.5
Norgold Russet	296	91	1.070	4.0
BR-6864-11E	294	90	1.065	3.0
BR-6862-5E	287	88	1.071	3.0
BR-6859-3	274	94	1.060	2.5
BR-6863-1E	266	82	1.084	2.5
BR-5960-13	244	94	1.078	2.5
BR-6863-3	230	93	1.078	3.0
BR-6863-7	228	91	1.080	3.0
BR-7093-6	208	94	1.063	3.0
BR-6491-1	194	91	1.079	2.5
L.S.D. .05	63	6	0.003	
c.v.	15.0	4.9	0.208	

^{1/} 1 = Poor to 5 = Excellent

^{2/} BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - April 13, 1972

Harvest date - September 6, 1972

Row spacing - 38 inches

Plant spacing - 12 inches

Plot size - 2 rows, 10 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 500# 16-30-0 + 500# 21-6-0

TEXAS

B. A. Perry, R. E. Webb and M. C. Fuqua

Screening and Evaluation of Potato Varieties
and Breeding Lines

Yield Tests. Materials were provided for planting in three locations, but data are reported for only two. The varieties were planted in a randomized design with four replications. A replication consisted of 25 seedpieces, planted at 12-inch intervals with 40-inch row spacing. Dacthal at 12-14 pounds per acre was applied preemergence for weed control. The yields and other data are reported in Texas tables 1 and 2. The color ratings in Texas table 1 were provided by the Foods Laboratory at Texas A&M University.

Observation Lines. New breeding lines were also included consisting of a single row 10 to 25 feet in length, depending on the number of seedpieces available. The evaluation of these new lines is reported in Texas table 3. The yields reported are for Munday only, but the remainder of the data reported in this table is a composite of the results from College Station and Munday.

Summary and Conclusions. Overall yields are only moderately good. The best variety in the planting was BR5960-5, followed by BR5960-13. This line has the potential of becoming an excellent white variety for Texas.

Texas Table 1. Yield Test, College Station, 1972.

Variety	Yield CWT/Acre ^{1/}		Specific Gravity ^{2/}	Color Ratings	
	US #1	Total		Chip ^{3/}	Fry ^{4/}
Red Pontiac	97	110	62	4	4
Kennebec	100	110	77	3	3
Cascade	81	93	74	4	2
DT6063-1R	81	96	73	2	2
B 5408-2	97	103	65	4	3
B 5458-6	96	112	73	5	4
B 6044-14	111	117	96	3	2
BR6265-8	62	71	67	4	3
B 6544-4	76	96	82	4	3
B 6548-1	66	76	69	4	4
B 6708-1	57	72	83	4	3
B 6775-4	89	104	74	5	3
BR5960-5	121	134	84	3	2
BR5960-13	101	108	88	2	2

Planted: 2/23/72. Harvested: 6/6/72; 104 days

^{1/}Yields are based on average from four replications

^{2/}Determined with potato hydrometer; 1.0 omitted from all ratings

^{3/}Color ratings made using NPCI reference color chart

^{4/}U.S.D.A. Color French Fries

Texas Table 2. Yield Test, Munday, 1972.

Variety	Yield CWT/Acre ^{1/}		Ratings		
	US #1	Total	Maturity ^{2/}	Wind & Heat ^{3/}	Disease ^{4/}
B 6544-4	45 de	100	2	3	3
BR5960-13	155 bc	213	5	2	1
B 6708-1	43 de	103	1	2	2
B 6775-4	96 cde	168	4	2	1
B 6548-1	136 bc	182	3	3	2
Pontiac	129 bc	166	2	3	3
B 5408-2	63 de	130	2	3	3
BR5960-5	220a	263	4	1	2
B 5458-6	33 e	57	1	3	3
Cascade	82 cd	133	3	3	2
Kennebec	193ab	225	5	2	1
BR6265-8	69 de	97	1	4	1

Planted: 2/18/72. Harvested: 6/23/72.

^{1/}Yields are averages for 3 replications; significant differences indicated by use of Duncans Multiple Range Test.

^{2/}Maturity rated 1 to 5: 1 = early; 5 = late.

^{3/}Resistance rated 1 to 5: 1 = no burn; 5 = severe leaf burn.

^{4/}Disease damage rated 1 to 5: 1 = apparently free; 5 = severe damage.

Texas Table 3. Observation Test, 1972

Variety or Breeding Line	US #1 Yield ^{1/} CWT/Acre Munday	Ratings		
		Appearance ^{2/}	Maturity ^{3/}	Disease ^{4/}
B7169-7	273	1	4	2
B7169-8	208	1	3	3
B7200-6	241	1	4	2
B7200-8	221	2	4	2
B7200-30	294	2	3	2
B7200-34	-	2	3	2
B7200-35	305	2	2	2
B7781-13	-	2	3	2
B7791-2	-	2	4	2
B7808-1	-	2	3	3
66-129-6	-	2	4	2
70-535-2	-	2	4	2
UX-123-4-2	-	1	4	2
67-64-6	-	1	5	2
WC314-2	-	2	3	2
65-15-7	-	2	3	2
WC285-141	-	2	3	2
UX1-41-5	-	2	4	1
WC284-7	-	2	3	2

Planted February 18, 1972; Harvested June 23, 1972.

^{1/}Yields are for a single replication.

^{2/}Appearance rated 1 to 5: 1 = very good; 5 = rough.

^{3/}Maturity rated 1 to 5: 1 = early; 5 = late.

^{4/}Disease rated 1 to 5: 1 = apparently free; 5 = severe.

VERMONT

S. C. Wiggans, W. R. Kelly, R. N. Jensen, and H. J. Murphy

During 1972 three potato variety trials were conducted in Vermont by the Plant Pest Control Division of the Vermont Department of Agriculture, the Plant and Soil Science Department at the University of Vermont, and the Plant and Soil Science Department at the University of Maine. These trials were located at Rutland, Wolcott, and South Burlington. There were 17 varieties at Rutland and Wolcott, and 20 varieties at South Burlington. There were five replicates in a randomized block at each location. Seedpieces of all varieties were planted by hand. They were 9 inches apart for all varieties except Desiree and Russet Burbank which were planted 18 inches apart. These plantings were part of the tri-state cooperative variety trial of the National Potato Breeding Program.

The plots at Rutland were planted on May 19 and harvested September 15. Fertilizer was applied at the rate of 100-200-200 per acre. Potatoes were grown in a very light soil. The plots suffered severe hail damage in July. Rainfall was above normal and seasonal temperatures below normal (Vermont Table 1).

The plots at Wolcott were planted May 26, killed September 9, and harvested September 29. Fertilizer was applied at the rate of 144-216-216 per acre. The potatoes were grown in a medium loamy soil. There was adequate moisture with a cooler than normal season. Yields were satisfactory (Vermont Table 2).

The plots in South Burlington were planted May 26 and harvested September 26. Fertilizer was broadcast at a rate of 100-100-100 and sidedressed at 50-50-50. The potatoes were planted in a light sandy soil. No irrigation was necessary due to the above normal rains and a below normal temperature (Vermont Table 3).

Abnaki, although relatively low yielding at Burlington, is of interest to Vermont growers. Cascade yielded well at all three locations and appears to be adapted to Vermont growing conditions. Line BR6305-22 also yielded well at all three locations; however, the tubers are slightly rough and have some growth cracks. Line BR6316-5 had yielded well at all three locations. This variety is medium early and has good disease resistance, especially to verticillium wilt. Line F59103 yielded well at Rutland and appears to have possibilities for Vermont growers. Line BR6312-2, a late variety, yielded well in Burlington and was the best yielding variety at Rutland and Wolcott; however, it has a low specific gravity

Table 1. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, total solids and chip color for 17 potato varieties grown at Rutland, Vermont - 1972.

Variety ^{1/}	Yield above 1 1/2 inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids	Chip color
Cascade	316abc	86.0	39.4	1.074d-g	18.95	9.2bcd
Cobbler	291bc	91.6	45.4	1.080b-e	20.21	8.8cde
Desiree	260b-e	72.2	15.8	1.085b	21.27	7.6gh
Iopride	213de	87.2	37.4	1.074d-g	18.95	8.2efgh
Katahdin	285bcd	85.1	37.6	1.082bcd	20.64	9.2bcd
Kennebec	378bc	92.6	55.8	1.081bcd	20.43	8.2efgh
Oromonte	285bcd	78.6	36.6	1.080b-e	20.21	8.1fgh
York	193e	79.3	33.2	1.085b	21.27	7.9fgh
B5267-2	255cde	91.1	41.6	1.078b-f	19.79	9.4abc
B6097-9	314abc	84.0	28.3	1.093a	22.96	9.2bcd
BR5957-7	190e	77.5	34.0	1.078b-f	19.79	8.5def
BR5960-13	301abc	95.5	68.8	1.081bcd	20.43	7.5h
BR6306-22	338ab	92.4	43.2	1.071g	18.32	9.4abc
BR6312-2	382a	95.3	70.0	1.076c-e	19.37	10.0a
BR6316-5	313abc	94.8	52.0	1.092a	22.75	8.3ef
BR6626-5	305abc	83.3	35.8	1.084b	21.06	9.9ab
F59103	321abc	96.7	77.5	1.073fg	18.74	7.8gh

^{1/}Planted - May 19; harvested - September 15, 1972.

Seedpieces of all varieties spaced 9 inches apart.

Fertilizer: 100-200-200.

Table 2. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, total solids and chip color for 17 potato varieties grown at Wolcott, Vermont - 1972.

Variety ^{1/}	Yield above 1½ inches Gwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1¼ to 4 inches	Specific Gravity	Percentage total solids	Chip color
Cascade	311abc	94.4	71.6	1.072d	19.53	9.9a
Cobbler	282bcd	96.2	70.0	1.075cd	19.16	9.5ab
Desiree	216de	93.2	55.5	1.081ab	20.43	8.8bc
Iopride	195e	95.0	70.2	1.070de	18.10	9.4ab
Katahdin	272bcd	95.9	83.9	1.075cd	19.16	9.2abc
Kennebec	287bc	95.9	79.3	1.078bc	19.79	9.2abc
Oromonte	311abc	96.2	74.1	1.085a	21.27	9.3ab
York	250cde	95.1	76.6	1.078bc	19.79	8.7bc
B5267-2	295bc	97.0	77.1	1.075cd	19.16	9.0bc
B6097-9	292bc	94.5	64.7	1.081ab	20.43	8.7bc
BR5957-7	281bcd	97.5	82.1	1.071de	18.32	9.6ab
BR5960-13	291bc	96.9	76.4	1.085a	21.27	9.2abc
BR6306-22	324ab	97.2	77.3	1.065f	17.05	8.3c
BR6312-2	370a	94.2	86.2	1.062f	16.42	9.7ab
BR6316-5	287bc	97.0	82.1	1.083a	20.85	10.0a
BR6626-5	314abc	94.7	67.1	1.077bc	19.58	8.8bc
F59103	280bcd	96.5	78.1	1.067ef	17.47	10.0a

^{1/}Planted - May 26; killed - September 9; harvested - September 29, 1972.

Seedpieces of all varieties spaced 9 inches apart.

Fertilizer: 144-216-216

Table 3. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, total solids and chip color for 20 potato varieties grown at Burlington, Vermont - 1972.

Variety ^{1/}	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids	Chip color
Abnaki	150cd	89.3	33.3	1.082f	20.64	8.1def
Bake King	189abc	82.3	16.7	1.107a	25.91	9.4ab
Cascade	225a	88.9	33.3	1.088de	21.90	9.4ab
Cobblers	186abc	85.3	28.7	1.086e	21.48	7.8ef
Desiree	110de	69.4	3.3	1.089de	22.11	7.0gh
Green Mountain	221a	83.4	26.5	1.103b	25.07	9.6ab
Iopride	155cd	92.3	45.4	1.070h	18.10	8.7cd
Katahdin	163bc	89.7	36.2	1.089de	22.11	7.8ef
Kennebec	189abc	88.8	30.8	1.089de	22.11	7.0gh
Norland	140cde	83.7	27.9	1.070h	18.10	8.4cde
Oromonte	154cd	81.8	26.2	1.094c	23.17	7.5fg
Russet Burbank	101e	47.7% 4 to 10 oz. size		1.092cd	22.75	9.1bc
Superior	101e	81.5	34.6	1.093cd	22.96	8.0def
Wauseon	142cde	93.2	44.3	1.077g	19.58	8.5cde
B6356-1	146cde	76.2	12.9	1.074gh	18.95	9.9a
BR6263-2	207ab	92.3	31.6	1.078fg	19.79	7.9def
BR6306-22	231a	95.3	64.2	1.082f	20.64	9.7ab
BR6312-2	220a	97.7	55.8	1.099b	24.22	9.8ab
BR6316-5	147cde	96.8	69.2	1.100b	24.44	6.9gh
BR6863-3	156cd	91.3	39.1	1.077g	19.58	6.7h

^{1/}Planted - May 26; harvested - September 26, 1972.

Seedpieces of Russet Burbank and Desiree spaced 18 inches apart; all others 9 inches.

Fertilizer: 100-100-100 broadcast; 50-50-50 sidedressed.

VIRGINIA

Boyett Graves

Variety and Seedling Evaluations

Procedure. Trials were grown at the Virginia Truck and Ornamentals Research Station at Painter, Virginia. All selections were grown in five-replicate plots except the long, white-skinned types which were grown in single, 20-foot plots. Fertilizer was band placed at planting at 1,000 lbs. of 10-10-10 per acre. Phorate (Thimet) systemic insecticide was applied at planting at the rate of 2.5 lbs. active ingredient per acre. The plots received one inch of irrigation on June 9. Seed were cut, treated, and planted on March 14, 1972, and harvested on July 10. Samples for chipping were removed on day of harvest and shipped to Wise Potato Chip Company, Berwick, Pennsylvania, for chip evaluations. Specific gravity determinations were made 2 days later.

Air Pollution. Air pollution problems are noteworthy to mention in this report. Serious economic losses due to air pollution--mostly ozone damage--were experienced by a few growers in 1971. In 1972, losses were not as significant; however, fields with severely damaged spots were not uncommon. Generally the earlier maturing varieties used in eastern Virginia (Superior, La Chipper, Alamo) have been most adversely affected. The more tolerant varieties (Pungo, Penn 71, Katahdin) occasionally are damaged to the point that yields are significantly reduced. Resistance-susceptibility ratings on the selections grown in 1972 are shown in Virginia Tables 1 and 2 under the heading "Speckle Leaf Rating."

Virginia Table 1. Yield, specific gravity, plant vigor, chip color and air pollution ratings on potato selections grown for 2 or more years on the Eastern Shore of Virginia. 1972.

	Cwt/A Size A	Specific Gravity at Harvest	Appearance Rating ^{1/}	Speckle Leaf Rating ^{2/}	Chip Color ^{3/}		Plant Vigor ^{4/}
					2 Days After Harvest	Av. 6 Cookings 30 Days	
Wauseon	213	1.060	1.5	MT	1.0	2.1	2.0
Alamo	200	1.057	2.0	MS	3.0	4.3	1.5
Pungo	238	1.069	3.0	MR	5.0	3.8	1.5
Superior	236	1.066	2.0	MT	6.0	4.5	2.0
Nor. Russet	230	1.071	2.0	MT			2.0
LaChipper	190	1.067	3.0	MS	1.0	2.8	2.0
Norchip	266	1.073	3.0	T	1.0	2.0	2.0
Katahdin	197	1.057	2.0	T	4.0	4.6	3.0
Shurchip	258	1.060	2.5	T	4.0	4.5	2.5
Abnaki	257	1.065	1.5	T			2.0
FL 162	236	1.071	3.0	S	5.0	4.1	2.0
Cobbler	189	1.069	3.5	S			2.5
70 A 12	260	1.075	3.0	T	1.0	2.3	1.5
Penn 71	254	1.070	2.0	MR	2.0	3.3	1.5
64 G2-3W	242	1.068	2.0	MS	3.0	3.1	2.0
B 6044-14	215	1.076	1.5	MS	2.0	3.3	4.0
B 6097-9	214	1.074	1.5	MS			4.0
B 6139-11	224	1.072	1.5	T	2.0	3.0	3.0
B 6495-20	281	1.085	2.0	T	1.0	3.0	1.0
B 6516-20	239	1.081	2.5	T			1.5
B 6516-27	201	1.063	1.5	MS	4.0	4.0	2.5
B 6516-28	239	1.074	2.0	MS	3.0	3.5	2.0
B 6518-10	281	1.071	1.5	T	6.0	4.6	1.0
B 6595- 5	280	1.070	1.5	T	2.0	2.6	1.0
Pennchip	178	1.067	3.0	T			1.0
58C 19-2H	223	1.065	3.0	MT	4.0	4.6	1.5
64C2-3H	260	1.065	1.5	T	5.0	3.3	1.0

^{1/}Appearance or eye appeal: 1.0=exceptionally good; 5.0=very, very unattractive.

^{2/}Rating of resistance or susceptibility to air pollution injury: VS=very susceptible; S=susceptible; MS=moderately susceptible; MT=moderately tolerant; T=tolerant; MR=moderately resistant; R=resistant.

^{3/}Chip color rating: 1.0-3.0=light color and desirable; 4.0=barely marketable; 5.0=medium brown; 6.0-10.0=dark brown to black and unmarketable.

^{4/}Plant vigor rating: 1.0=plants thrifty and fast growing; 5.0=plants unthrifty, thin and slow growing.

Virginia Table 2. Yield, specific gravity, plant vigor chip color, and pollution ratings of seedlings grown for the first time on the Eastern Shore of Virginia. 1972.

	Cwt/A Size A	Specific Gravity at Harvest	Appearance Rating ^{1/}	Speckle Leaf Rating ^{2/}	Chip Color ^{3/}		Plant Vigor ^{4/}
					2 Days After Harvest	Av. 6 Cookings 30 Days	
B 6692-9	280	1.073			-	-	-
NY 41	271	1.064	1.5	MT	-	-	1.5
B 7164-25	243	1.067	1.0	S	3.0	2.8	1.5
71-110	243	1.058	2.0	MT	6.0	5.3	1.0
F 9-31	241	1.069	2.0	MS	4.0	3.5	1.0
BR 6246-1	239	1.061	2.5	MR	-	-	1.0
B 7154-10	236	1.057	1.5	S	1.0	1.5	2.0
B 7165-10	227	1.065	2.5	S	4.0	3.1	2.5
B 7132-26	227	1.071	3.5	MS	-	-	2.0
B 6516-15	226	1.074	2.5	MS	-	-	2.0
B 7012-N18	219	1.063	2.0	MT	5.0	6.0	2.0
B 7132-14	213	1.057	2.0	MS	3.0	3.0	3.5
71-82	210	1.062	2.0	S	-	-	2.0
B 6516-18	209	1.069	2.0	MS	2.0	3.1	2.5
B 6761-11	204	1.050	1.5	VS	-	-	4.0
B 5282-13	203	1.067	2.0	MT	2.0	4.5	2.0
B 6516-5	202	1.074	2.0	VS	1.0	1.6	3.5
B 7145-1	198	1.050	1.0	VS	3.0	3.5	3.0
B 6558-16	194	1.067	3.0	S	-	-	3.5
B 7167-2	192	1.067	2.0	S	1.0	1.5	3.0
B 6712-9	190	1.067	1.5	MS	-	-	2.0
B 6761-12	188	1.060	2.0	S	-	-	1.5
B 7138-2	186	1.080	3.0	VS	-	-	2.0
B 6712-17	183	1.067	1.5	MS	2.0	2.6	2.5
B 7155-65	181	1.059	1.5	VS	-	-	3.5
B 7167-14	176	1.059	2.0	VS	1.0	1.5	4.0
B 5287-16	173	1.055	1.0	S	5.0	5.5	3.5
B 7145-3	171	1.059	1.5	S	4.0	3.8	3.0
B 6815-19	161	1.054	1.0	VS	5.0	4.6	2.0
B 7152-40	158	1.057	1.0	S	2.0	2.5	2.5
B 7132-27	151	1.066	2.0	VS	-	-	2.0
B 6597-N3	143	1.066	2.5	VS	1.0	2.5	2.5
B 7139-12	140	1.060	3.0	S	-	-	3.5
B 6739-3	137	1.066	1.0	S	-	-	5.0
B 5647-8	134	1.055	1.0	VS	-	-	4.0
BR 6320-1	118	1.070	1.0	VS	-	-	4.0
B 6595-12	110	1.079	1.5	S	-	-	2.5

^{1/}Appearance or eye appeal: 1.0=exceptionally good; 5.0=very, very unattractive.

^{2/}Rating of resistance or susceptibility to air pollution injury: VS=very susceptible; S=susceptible; MS=moderately susceptible; MT=moderately tolerant; T=tolerant; MR=moderately resistant; R=resistant.

^{3/}Chip color rating: 1.0-3.0=light color and desirable; 4.0=barely marketable; 5.0=medium brown; 6.0-10.0=dark brown to black and unmarketable.

^{4/}Plant vigor rating: 1.0=plants thrifty and fast growing; 5.0=plants unthrifty, thin and slow growing.

WASHINGTON

William G. Hoyman

The potato processing industry in Washington has had a phenomenal increase the past few years. Approximately 75 percent of the 1972 crop was processed. The potato breeding program is oriented to obtain new russet-skin varieties for the processing and fresh market industries. Russet Burbank has been the principal processing variety. A new variety could alleviate some of its disadvantages. A new, early russet is needed for the fresh market to replace the hollow heart-susceptible Norgold Russet. The data in Tables 1 and 2 indicate progress has been made in replacing these two varieties.

August Harvest Trial (Table 1). Two russets with yields comparable to Norgold Russet were 284-1 and 330-1. Each had a higher specific gravity than Norgold Russet and was more resistant to Verticillium albo-atrum (Table 2). White selections with high yields were B4147-21, BR5960-5 and BR7093-20. The latter had the highest specific gravity (1.092) and chips made from it were the lightest in color (No. 3).

October Harvest Trial (Table 2). The long growing season in eastern Washington is one factor contributing to the highest yields in the United States. Allowing the vines to grow two months longer--August to October--increased the yields considerably. October harvest average yield was 725 cwt. per acre compared to 369 for the August harvest. Selection 352-1 increased its yield 773 cwt. and had a high specific gravity of 1.096. It made light-colored chips directly from harvest. Resistance to V. albo-atrum was a factor contributing to the large increase of 352-1. This selection was extremely resistant to V. albo-atrum. Ninety-four percent of the total Russet Burbank yield consisted of No. 2 tubers compared to 2.9 percent for 330-1 and 10.7 percent for Norgold Russet.

Reaction to Diporotheca rhizophila, V. albo-atrum and Meloidogyne hapla (Table 3). Most all selections were infected with D. rhizophila (blackroot), and in many instances the infections were moderate to severe. Root infection by M. hapla (root-knot) was seldom more than slight. There appeared to be no complimentary action between V. albo-atrum and M. hapla. Some of the most wilt-resistant selections were the most susceptible to root-knot and vice versa.

Reaction of Solanum species to Diporotheca rhizophila and Meloidogyne hapla (Table 4). Many Solanum species were free of root-knot and blackroot symptoms. S. microdontem (320312) had the most extensive root system and was free of blackroot and root-knot symptoms. Very few species formed tubers under the long days at Prosser.

Observational Trial (Table 5). Advanced selections from various sources were planted in soil infested with V. albo-atrum. The wilt readings show many were dead by September 14, while a few were free of vine symptoms. Eight selections will be included in the 1973 variety trials.

Washington Table 1. August harvest trial, Prosser, Washington, planted April 10 and harvested August 1.

Selection or variety	Number tubers	Cwt. per acre		Percent tubers scab	Specific gravity	Chip Color	Tuber characteristics
		Total yield	No. 2's				
284-1	249	464	21	7	1.082	8	R, Ob, nice
300-6	279	292	192	9	1.079	9	R, L, small
316-3	176	131	82		1.072	9	R, small
327-3	187	206	62	5	1.074	9	R, L, rough
330-1	295	499	48		1.084	8	R, Ob, nice
352-1	318	358	34	11	1.087	8	W, blocky
A503-42	441	440	76	13	1.077	7	W, rough, DSE
A6371-2	367	289	265	4	1.081	8	R, L, small
A6334-19	240	217	69		1.072	9	R, L
A62180-2	242	272	45		1.064	8	R, Ob, flat
A66107-180	386	354	69	4	1.080	10	W, blocky, flat
B7147-8	305	389	62		1.086	6	R, L
B7147-15	189	303	39	7	1.096	8	R, blocky
B7147-21	455	488	131		1.083	8	W, L, small
BR5960-5	356	530	38	5	1.086	7	W, blocky
BR6316-5	215	361	38	2	1.086	5	W, blocky
BR6316-7	497	358	137	2	1.086	8	W, rough
BR6835-1E	403	382	100	1	1.089	8	W, Ro, small
BR6835-5E	336	378	65	9	1.078	7	W, Ro
BR6863-3	236	385	27	2	1.088	4	W, Ro
BR7093-4	274	382	34	25	1.086	7	W, blocky
BR7093-5	225	364	38	2	1.085	5	W, Ro
BR7093-20	240	423	34	9	1.092	3	W, blocky, DSE
Cascade	337	488	48		1.075	9	W, blocky
Cascade M	328	320	45	2	1.069	8	W, blocky
Kennebec	249	419	34		1.076	8	W, blocky
Norgold Russet	326	499	31	1	1.075	9	R, Ob
Russet Burbank	251	333	148		1.082	8	R, L, rough

1/ From 40 hills

3/ Includes tubers with slight to severe scab

2/ Scabby tubers not included in No. 2's

4/ R = russet, W = white, Ro = round

Ob = oblong, L = long, and DSE = deep seed end

Washington Table 2. October harvest trial, Prosser, Washington. Planted April 10 and harvested October 5, 1972

Selection or variety	Cwt. per acre			Hollow	Percent ^{3/} tubers scab	Verti- ^{4/} cillium wilt	Specific gravity	Chip Color
	Number ^{1/} tubers	Total yield	No. ^{2/} 2's					
168-3	419	873	79			1.25	1.097	5
284-1	362	653	21		2	3.50	1.076	5
300-6	291	757	24			0.50	1.072	5
316-3	497	790	62	27		0.00	1.079	7
327-3	320	591	52	7		0.75	1.076	5
330-1	338	729	14			4.00	1.080	6
352-1	445	1131	24		12	0.25	1.096	3
A503-42	689	832	52	7	5	1.25	1.080	6
A6371-2	515	818	52		4	0.25	1.094	4
A6334-19	403	657	34			0.50	1.080	6
A62180-2	341	684	31	17		0.00	1.074	5
A66107-180	435	770	72	4	1	1.00	1.082	7
B7147-8	311	471	14		7	3.75	1.091	3
B7147-15	211	550	34		35	2.50	1.092	5
B7147-21	389	619	62		14	4.25	1.085	6
BR5960-5	367	829	72		19	2.25	1.075	3
BR6316-5	291	554	21		40	3.50	1.091	4
BR6316-7	599	1048	52		8	0.25	1.092	4
BR6835-1E	436	519	45		28	4.00	1.085	3
BR6835-5E	413	512	58		25	3.50	1.080	3
BR6863-3	239	512	10	3		3.00	1.092	2
BR7093-4	341	757	17		18	4.25	1.082	5
BR7093-5	233	949	17	41	41	0.25	1.085	5
BR7093-20	224	485	7	4	26	4.50	1.084	3
Cascade	382	736	34		13	3.00	1.085	3
Cascade M	470	987	52		8	0.00	1.093	5
Kennebec	258	801	172	14	31	2.50	1.083	6
Norgold Russet	405	640	69	4		4.75	1.072	5
Russet Burbank	366	922	870			2.00	1.081	6

^{1/} From 40 hills

^{2/} Scabby tubers not included in No. 2's

^{3/} Includes tubers with slight to severe scab

^{4/} Vine readings taken Aug. 28, 1972

Washington Table 3. Reaction of cultivars to Diporotheca rhizophila (blackroot), Verticillium albo-atrum (wilt) and Meloidogyne hapla (root-knot). Roots examined July 6 - July 11. Tubers harvested October 6, 1972.

Cultivar	Root disease index ¹ / ₁₀₀		Vine wilt index ¹ / ₁₀₀	Number of tubers			Galless tubers			
	Black-root	Root-knot		Total	Galled	Galless with internal lesions	In internal lesion categories			
							1-10	11-20	21-30	
168-3	2.0	1.5	1.5	43	11	13	12	1		
245-2	3.5	0.5	3.0	44	21	11	9	1		1
284-1	2.0	0.5	3.5	44	9	13	13			
300-6	3.0	1.5	0.0	44	17	3	3			
316-1	2.0	1.0	0.0	44	21	5	5			
316-3	3.5	0.0	0.5	44	2	17	6	5		6
320-1	3.5	1.5	1.0	44	11	4	4			
326-1	1.5	0.5	0.5	46	22	16	14	2		
327-2	2.0	1.0	0.5	44	40	0				
327-3	1.5	0.5	2.0	38	11	8	8			
330-1	2.5	1.5	1.5	44	21	14	11	2		1
352-1	1.5	0.5	0.0	40	19	19	1	6		12
356-1	1.5	1.0	0.0	44	16	26	6	5		15
A477-8	0.5	0.0	0.0	44	14	23	18	1		4
A483-6	2.0	0.0	1.0	44	5	20	13	7		
A503-42	2.5	1.5	1.0	44	38	1	1			
A6305-20	3.0	0.0	3.0	44	2	3	3			
A6334-19	0.5	0.5	0.0	44	5	16	16			
A6353-6	3.5	1.0	0.0	44	6	10	10			
A6371-2	1.5	1.0	2.0	44	7	5	5			
A6371-3	4.0	0.0	0.0	44	8	21	15	6		
A6382-10	2.0	0.0	2.5	44	0	2	2			
A6477-4	1.0	0.0	0.0	40	0	16	14	1		1
A6536-5	2.0	0.0	2.0	44	1	22	21	1		
A6673-15	1.0	0.0	0.5	46	0	1	1			
A6698-2	0.5	0.0	0.0	40	7	10	10			
A62180-2	2.5	1.5	0.0	44	23	6	6			
A63123-7	3.5	0.0	2.0	44	11	4	4			

Washington Table 3, continued.

Cultivar	Root disease index ¹ / ₂		Vine wilt index ¹ / ₂	Number of tubers			Galless with internal lesions	Galless tubers in internal lesion categories		
	Black-root	Root-knot		Total	Galless	In internal lesion categories				
						1-10		11-20	21-30	
A63126-2	1.5	0.5	3.5	44	13	16	12	4		
A63126-9	3.0	0.5	0.5	44	0	23	21	2		
A63134-45	4.0	0.5	2.0	44	0	9	9			
A64187-4	2.5	0.5	0.0	44	19	0				
A64206-4	3.0	0.5	2.5	44	0	16	16			
A64206-5	3.0	1.0	0.5	40	22	4	4			
A66107-44	1.0	0.5	0.0	44	0	8	8			
A66107-69	3.0	0.5	0.0	44	8	16	16			
A66107-75	2.0	0.0	0.5	44	9	29	20	6	3	
A66107-98	1.0	0.0	0.0	40	4	2	2			
A66107-101	2.5	0.5	0.0	44	0	0				
A66107-116	1.5	1.0	0.5	46	11	29	20	7	2	
A66107-180	0.5	0.5	1.5	44	7	12	10	2		
A66119-7	1.0	0.0	0.0	44	0	3	3			
A66122-3	0.0	0.5	0.0	44	0	28	24	3	1	
Ala 2-70	1.0	0.5	0.0	44	1	26	8	4	14	
Ala 5-70	1.0	0.5	3.0	44	0	2	2			
Ala 16-70	1.0	0.0	0.0	44	0	9	9			
Ala 24-70	2.0	1.0	2.5	44	0	2	2			
B6936-73	1.5	0.5	0.5	45	3	7	7			
B6936-91	1.5	0.5	1.0	44	29	3	3			
B6936-121	2.5	0.5	3.5	42	14	6	6			
B6943-58	1.5	0.0	2.0	43	5	22	20		2	
B6990-126	1.5	1.0	1.5	44	2	14	14			
B7024-33	1.0	0.0	2.5	44	6	1	1			
B7024-63	2.0	0.0	4.5	42	7	1	1			
B7024-88	2.0	0.0	2.5	44	5	2	2			
B7033-49	2.5	0.5	4.0	44	2	2	2			

Washington Table 3, continued.

Cultivar	Root disease index ^{1/}		Vine wilt index ^{1/}	Number of tubers			Galled tubers		
	Black root	Root-knot		Total	Galled	Galled with internal lesions	In internal lesion categories		
							1-10	11-20	21-30
B7033-103	2.5	0.5	1.0	44	0	2	2		
B7147-15	0.5	0.5	3.0	44	13	2	2		
B7147-25	3.0	0.5	5.0	40	0	1	1		
B7147-43	1.0	0.5	5.0	40	0	18	18		
B7147-80	1.0	1.0	5.0	44	0	0			
B7154-3	3.0	0.0	4.0	44	3	7	7		
B7155-51	1.0	0.5	2.5	43	0	6	6		
B7155-66	1.5	0.5	3.0	42	0	0			
B7160-4	3.5	0.5	4.5	44	15	3	3		
B7167-32	2.0	1.0	1.0	44	0	0			
B7196-4	1.0	0.5	5.0	44	0	2	2		
B7196-23	1.5	0.5	5.0	44	0	10	10		
B7196-25	2.0	0.0	4.5	45	0	1	1		
B7196-27	0.0	1.0	4.5	46	0	0			
B7196-82	1.0	0.0	1.0	44	0	0			
BR5960-5	2.0	1.0	1.0	42	8	14	14		
BR6316-5	3.5	1.0	2.0	44	41	0			
BR6316-7	2.0	1.5	0.0	46	23	12	11	1	
BR6491-1	0.5	0.5	2.5	44	16	11	11		
BR6835-1E	2.5	0.5	3.0	45	10	20	11	8	1
BR6835-5E	0.5	0.5	2.0	44	6	2	2		
BR6863-3	4.5	0.0	4.0	44	0	5	5		
BR7066-1	1.0	1.5	2.5	44	0	1	1		
BR7070-3	2.5	1.0	4.5	47	8	19	19		
BR7072-12	2.0	0.0	2.5	44	0	1	1		
BR7082-2	1.0	0.0	3.0	44	2	3	3		
BR7085-1	3.5	0.0	3.5	43	0	0			
BR7088-2	1.5	0.5	2.0	42	5	0			
BR7093-4	2.0	1.0	2.0	44	2	38	28	7	3

Washington Table 3, continued.

Cultivar	Root disease index		Vine wilt index	Number of tubers			Galless tubers		
	Black-root	Root-knot		Total	Galless with internal lesions	In internal lesion categories			
						1-10	11-20	21-30	
BR7093-5	1.5	1.5	0.5	44	34	5	5		
BR7093-6	2.5	0.0	4.5	44	0	0			
BR7093-20	2.5	1.0	5.0	44	34	0			
BR7093-23	1.5	0.0	0.5	44	5	21	21		
BR7096-1	2.5	0.0	5.0	44	0	0			
BR7103-2	1.5	0.5	2.0	44	3	7	7		
CA06-5	2.0	0.0	3.0	44	0	4	4		
CA23-5	2.0	0.0	4.0	44	0	2	2		
CA25-1	3.0	0.5	1.5	40	0	4	4		
CA28-2	1.5	0.0	1.5	44	0	7	6	1	
CA61-3	0.0	0.0	3.5	40	18	2	2		
NDA7938-3	3.5	0.0	0.5	42	4	3	3		
WC300-4	2.5	0.0	1.0	44	2	13	13		
WC302-7	1.5	0.0	4.0	44	0	0			
WC304-4	3.5	0.5	3.0	44	0	11	11		
WC314-2	1.5	0.5	2.5	44	1	7	7		
WC314-3	3.0	0.0	0.0	44	1	0			
WC315-1	3.0	1.0	2.5	44	0	10	10		
WC316-1	1.5	0.5	3.5	44	4	3	3		
WC316-3	1.5	0.5	2.0	40	5	2	2		
WC325-1	2.5	2.0	0.0	44	12	10	10		
WC325-5	1.0	0.0	0.0	42	20	0			
WC330-4	2.0	0.5	0.0	44	2	11	11		
WC330-7	0.5	0.5	2.5	44	24	4	4		
Cascade	3.0	0.5	3.0	44	6	10	10		
Cascade M	2.5	2.0	0.0	44	20	9	9		
Kennebec	1.0	0.5	2.5	45	22	13	13		
B5141-6	1.5	1.0	1.0	43	22	13	13		

Washington Table 3, continued.

Cultivar	Root disease index ^{1/}		Vine wilt index ^{1/}	Number of tubers			Galled tubers		
	Black-root	Root-knot		Total	Galled	Galled with internal lesions	In internal lesion categories		
							1-10	11-20	21-30
Norchip	2.0	1.0	3.5	43	15	10			
Norgold Russet	3.5	0.5	4.5	44	19	3			
Russet Burbank	1.0	1.0	1.0	44	0	42	6	8 28	

^{1/} 0 = no symptoms, 5 = severe symptoms.

Washington Table 4. Incidence of Diporotheca rhizophila (blackroot) and Meloidogyne hapla (root-knot) on roots of Solanum species. Dug July 30, 1972.

Species	Introduction number	Black ^{1/} root	Root ^{1/} knot
S. acaule	275129	0	0
"	365310	1	0
S. berthaultii	283070	0	0
"	310971	0	0
S. boliviense	265860	0	1
"	265861	0	0
S. brachycarpum	230459	0	0
"	275180	1	0
S. bulbocastanum	243504	0	0
"	243510	1	0
"	255516	0	0
S. canasense	230511	1	0
"	283074	0	0
"	283084	0	0
S. cardiophyllum	255519	0	0
"	275212	0	0
"	275216	0	0
S. chacoense	320282	0	0
"	320285	2	1
S. demissum	365380	0	0
"	365384	0	0
"	365391	1	0
S. fendleri	275164	0	0
S. gandarillasii	265866	0	0
S. gourlayi	210038	0	0
"	265579	0	1
S. guerreroense	161730	0	0
S. hjertingii	251065	1	0
S. hougasii	1569	1	0
S. infundibuliforme	265867	1	0
"	310976	0	0
S. iopetalum	275181	0	0
"	275182	0	0
S. jamesii	275262	0	0
"	275265	1	1
S. kurtzianum	175434	1	0
"	320271	0	0
S. marinasense	310945	0	0
"	310946	0	0
"	365332	2	0
S. megistacrolobum	265873	0	0
"	275147	0	0
"	320302	0	1
S. microdontum	320306	2	0
"	320312	0	0
"	320315	0	0

Washington Table 4, continued.

Species	Introduction number	Black- ^{1/} root	Root- ^{1/} knot
<i>S. mochicense</i>	388616	0	0
<i>S. multidissectum</i>	210055	0	0
"	265876	0	0
"	283072	1	0
<i>S. multiinterruptum</i>	275272	0	0
<i>S. pampasense</i>	275275	3	0
<i>S. papita</i>	275227	1	0
"	275228	4	0
"	275229	1	0
<i>S. phureja</i>	320375	0	0
"	320380	4	4
"	320381	2	0
<i>S. pinnatisectum</i>	186554	0	0
"	230489	3	0
"	275234	1	0
<i>S. polyadenium</i>	275238	1	1
"	310963	1	0
"	320342	0	0
<i>S. polytrichon</i>	255545	0	0
"	365393	0	0
<i>S. raphanifolium</i>	296126	0	0
"	310951	0	0
"	320262	1	3
<i>S. sparsipilum</i>	265871	1	0
"	275276	0	0
"	310972	0	0
<i>S. spegazzinii</i>	205394	0	0
"	208876	0	0
"	275143	0	0
<i>S. stenotomum</i>	195214	1	0
"	234013	2	0
"	365344	0	0
<i>S. stoloniferum</i>	365397	0	0
"	265398	1	0
<i>S. tarijense</i>	208881	0	0
<i>S. tuberosum</i>	232841	1	0
<i>ssp. andigena</i>			
"	365402	0	0
"	365403	1	0
<i>S. venturii</i>	320327	0	0
"	320328	0	0
<i>S. vernei</i>	320329	0	0
<i>S. verrucosum</i>	275258	0	1
"	310966	0	0
"	365404	0	0
<i>S. violaceimarmoratum</i>	258856	0	0

^{1/} 0 = no symptoms, 5 = severe symptoms.

Washington Table 5. Observational trial of selections from various sources. Ten hills of each. Underlined selections to be tested in 1973.

Selection	Verticillium ^{1/} wilt		Tuber ^{2/} characteristics
	8/14	9/14	
<u>326-1</u>	0	5	R
327-2	0	0	R, Hollow, PT
356-1	0	0	W
328-2B	0	0	R, Hollow, PT
Ala 2-70	0	0	W, Scab, PT
Ala 5-70	1	4	W, Hollow, PT
Ala 16-70	0	0	W, Cracks, PT
Ala 24-70	3	5	W, Small, PT
B6934-121	0	3	W, Cracks, PT
B6936-73	2	4	W, Scab, PT
B6936-91	0	3	W, PT
B6943-58	1	5	W, Hollow, PT
B6990-126	1	5	W, Cracks, PT
B7024-33	1	5	W, Cracks, PT
B7024-63	5	5	W, Small, PT
B7024-88	2	5	W, Scab, PT
B7033-49	3	5	W, Cracks, PT
B7033-103	1	3	W, PT
B7147-15	1	5	R
B7147-25	4	5	R, Small
B7147-43	5	5	R, Small
B7147-80	4	5	R, PT
B7153-66	3	5	W, Hollow, PT
B7154-3	3	5	W, Hollow, PT
B7155-51	3	5	W, Scab, PT
B7160-4	3	5	R, PT
<u>B7167-32</u>	1	3	W, Nice type, Big yield
<u>B7196-4</u>	4	5	R, Small
B7196-23	5	5	R, PT
<u>B7196-25</u>	4	5	R
<u>B7196-27</u>	4	5	R, PT
B7196-82	1	4	R, PT
B7574-2	4	5	W, Small
B7575-1	5	5	R, PT
B7583-6	2	4	R, PT
B7583-19	0	1	R, Hollow, PT
B7608-2	2	5	R, Small, PT
B7629-7	2	5	W, PT
<u>B7645-5</u>	0	2	R
<u>B7645-17</u>	0	0	R, PT
B7655-2	2	5	R, PT
B7655-3	4	5	R, Small
<u>B7678-17</u>	1	5	R
<u>B7679-9</u>	4	5	R, PT

Washington Table 5 continued.

	Verticillium wilt		Tuber characteristics
	8/14	9/14	
B7684-4	3	5	R
B7711-12	4	5	R, Small
B7807-9	2	4	W, Hollow, Cracks, PT
B7813-1	5	5	R, Small
B8125	0	4	W, PT
B8157	4	5	W, Small
B9196-4	4	5	R, Small
BR6491-1	2	5	W, Cracks, PT
BR7066-1	2	5	W, Hollow, Cracks
BR7072-12	2	5	W, PT
BR7082-2	0	4	W, Hollow, PT
BR7085-1	3	5	W, PT
BR7088-2	0	5	W, Hollow, PT
BR7093-6	4	5	W, Small
BR7093-23	0	0	W, PT
BR7096-1	5	5	W, Hollow, PT
BR7103-2	1	5	W, Cracks, PT
CA06-5	1	3	W, PT
CA23-5	3	5	W, PT
CA25-1	2	5	W, Hollow, PT
CA28-2	0	0	W, Hollow, PT
CA61-3	3	5	W, Cracks, PT
WC309-4	0	2	R, Hollow, PT
WC302-7	4	5	R, Small
WC304-4	1	5	Slight R
WC314-2	3	5	R
WC314-3	0	0	R, Cracks, PT
WC315-1	2	5	R, Hollow, PT
WC316-1	3	5	R, Hollow, PT
WC316-3	0	4	R, Small
WC325-1	0	0	R, Hollow, PT
WC325-5	0	0	R, Hollow, PT
WC330-4	0	0	R, PT
WC330-7	2	5	R, PT

¹/vine readings, 0 = no symptoms, 5 = dead.

²/R = russet, W = white, PT = poor type including knobby, rough, pointed, flat and tubers with deep seed end.

WASHINGTON

N. Holstad, R. Kunkel and R. Holland

Results of the 1972 Potato Variety Trials

The 1972 potato variety trial was conducted near Othello, Washington, on a hill-irrigated 400 feet long area that had not been previously used for potato production. Eptam-Treflan was used for weed control. Insects and diseases were controlled on a preventive basis with WSU recommended materials.

The rows were 32 inches apart, and the seed was spaced 8.2 inches apart within the rows. Each plot consisted of two rows 28.5 feet long. Each selection was grown at three fertilizer levels--275, 350 and 425 pounds per acre of N, P₂O₅ and K₂O. The varieties were not randomized, but the fertilizer rates were randomized within each variety. The seed was grown in cooperation with the Washington State Department of Natural Resources at Bellingham, Washington.

The seed was planted on May 2, and most of the vine growth was killed by an early frost on September 26. The plot was harvested on November 2. Samples were held in storage at 40° F until January 5 then moved to 70° F and specific gravity readings were taken on January 7. On January 25 (20 days reconditioning at 70° F) two slices were cut from the middle of five tubers from each plot. These were rinsed in cold water and fried at 375° F until bubbling ceased. The chips were rated using the American Potato Chip Institute color chart.

Washington Table 1. Total yield in cwt/acre (two replications).

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 503-42	659	738	697	698
A 63184-6	677	680	767	708
A 6334-19	598	621	656	625
A 63126-9	581	677	551	603
A 6334-20	569	493	543	535
Norchip	610	478	458	515
A 6135-4	443	467	452	454

Washington Table 2. Percent U.S. No. 1 potatoes (two replications).

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 503-42	82	79	88	83
A 63184-6	93	93	95	94
A 6334-19	83	86	82	84
A 63126-9	85	69	75	76
A 6334-20	87	84	77	83
Norchip	78	68	67	71
A 6135-4	81	82	74	79

Washington Table 3. Specific gravity (coded omitting 1.0)--two replications.

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 503-42	76	75	74	75
A 63184-6	79	73	73	75
A 6334-19	80	75	75	77
A 63126-9	78	79	71	76
A 6334-20	79	73	75	76
Norchip	74	72	74	73
A 6135-4	72	68	66	69

Washington Table 4. Chip color^{1/2/} (two replications).

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 503-42	5.3	6.5	4.8	5.5
A 63184-6	7.5	7.0	8.0	7.5
A 6334-19	6.3	7.0	6.5	6.6
A 63126-9	7.3	6.0	8.0	7.1
A 6334-20	6.0	6.5	5.8	6.1
Norchip	6.0	6.5	6.5	6.3
A 6135-4	9.0	7.8	8.8	8.5

^{1/} The lower the value, the lighter the chip color.

^{2/} Held at 40° F until January 5, reconditioned for 20 days at 70° F, and then fried at 375° F until bubbling ceased.

Washington Table 5. Total yield in cwt/acre (one replication).

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 66122-3	674	697	758	710
A 6371-2	694	636	703	678
A 64206-4	665	688	683	679
Russet Burbank	---	---	653	653
A 59197-4	490	583	665	579
321-65	476	560	467	501
168-3	---	---	478	478

Washington Table 6. Percent U.S. No. 1 potatoes (one replication).

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 66122-3	78	79	75	77
A 6371-2	67	93	95	85
A 64206-4	69	74	72	72
Russet Burbank	--	--	82	82
A 59197-4	83	85	82	83
321-65	80	94	86	87
168-3	--	--	89	89

Washington Table 7. Specific gravity (coded omitting 1.0)--one replication.

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 66122-3	78	73	73	75
A 6371-2	87	84	90	87
A 64206-4	84	81	80	82
Russet Burbank	--	--	85	85
A 59197-4	81	80	79	80
321-65	95	97	90	94
168-3	--	90	88	89

Washington Table 8. Chip color (one replication).

Variety	Pounds/acre N, P ₂ O ₅ and K ₂ O			
	275	350	425	Ave.
A 66122-3	6.0	6.0	6.0	6.0
A 6371-2	7.0	6.5	8.0	7.2
A 64206-4	7.5	8.0	8.0	7.8
Russet Burbank	---	---	5.5	5.5
A 59197-4	4.0	4.0	4.0	4.0
321-65	4.0	4.0	4.5	4.2
168-3	---	6.0	6.0	6.0

WEST VIRGINIA

R. J. Young^{1/} and K. L. Deahl^{2/}

Potato Late Blight

Late blight of potato, caused by Phytophthora infestans (Mont.) de Bary, is perhaps the limiting factor to potato production in the Northeast, North Central, and Mid-Atlantic Regions of the United States. Cox and Large have observed that in a 10-year period, 5 or 6 are blight years in which average losses approach 10 percent (1). To minimize losses, potato growers in these regions will make 8 to 15 applications of protective fungicides to the crop each year primarily to control P. infestans. In some years, environmental conditions are less conducive to the development of the blight pathogen, consequently, fewer applications are necessary. Nevertheless, the use of fungicides to control late blight is one of the largest for any agricultural enterprise.

The development of blight resistance, both major gene resistance and multigenic resistance, have been of major importance in potato breeding programs in Europe and the United States. The successes of these programs are well documented. But the selection methods used in these programs have been seriously challenged (2). Renwick has hypothesized a possible relationship between late blight of potato and two birth defects in man, anencephaly and spina bifida cystica. He speculates further that blight-resistant clones may have a greater potential to produce certain toxic compounds in response to the host-parasite interaction. These compounds are suspected to be teratogenic and may be responsible for the birth defects. Preliminary data of Poswillo indicates some substances in rotted tuber tissue can cause microscopically recognizable defects in Marmosets (3). Those compounds implicated as teratogenic-like substances are: (1) the glycoalkaloids, solanine and chaconine; (2) the toxic coumarins, coumarin, scopletin, and umbelliferone; and (3) the phytoalexins, phytuberin and rishitin. Each of these materials have been shown to be present in diseased tissue and in certain instances in healthy tissue in low concentrations.

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- (1) Cox, A. E., and E. C. Large. 1960. Potato Blight Epidemics Throughout the World. Agr. Handbook No. 174. U.S. Dept. Agr., Agr. Res. Service, Washington, D.C.
- (2) Renwick, J. H. 1972. Hypothesis anencephaly and Spina Bifida are usually preventable by avoidance of a specific but unidentified substance present in certain potato tubers. Brit. J. Prev. Soc. Med. 26:67-88.
- (3) Poswillo, D. E., D. Sopher, and S. Mitchell. 1972. Experimental induction of foetal malformation with blighted potato: A preliminary report. Nature 239:462-464.

The purpose of this research was to determine the association between multigenic resistance to P. infestans and the glycoalkaloid level in tuber and leaf tissues, and to characterize selected measurable components considered to be operative in the expression of multigenic resistance. Lesion area, width of the sporulating annulus (SA), and the number of spores produced on the SA were the parameters selected in this study. Data was also obtained on the yield potential of 28 clones when exposed to an epiphytotic of P. infestans. One block of plants was sprayed with a commercial fungicide providing partial protection while another block was left unsprayed as a control.

Methods and Materials. Late blight test plots were planted in the Tygart River Valley near Huttonsville, West Virginia. Twenty-eight test lines, including appropriate controls, were arranged in a randomized block experimental design with 5 replications. Two identical plots were planted. A 10-20-10 fertilizer and the systemic insecticide (Disulfoton), respectively, were incorporated into preformed planting rows at rates of 200 lb. N and 18 lb. 10 percent granular per acre. Thirty seedpieces were hand dropped evenly over 25 ft. of row, and hilled. Border rows were planted with a "blight-resistant" seedling. Every third row was planted with either Pentland Ace (R-3), or 3R_C-8(R-2) to serve as sources of inoculum. The candidate seedlings were planted in the intervening rows. Since Phytophthora infestans (Race 1,4) is usually present every year in the Tygart Valley, the R-2 and R-3 differentials were planted to insure adequate foliage for the establishment and buildup of a selected race. In addition, two center rows were planted with Kennebec, Sebago, and Katahdin to provide for a continual release of inoculum over an extended period of time. The foliage of both Kennebec (R-1) and Sebago (R-0) possess a moderate to low level of multigenic resistance to P. infestans while the Katahdin foliage (R-0) provided for a rapid buildup of the pathogen.

Beginning with the first week in July, both plots were sprayed weekly with an insecticide. Plot B, however, was sprayed also with a fungicide (Maneb, initially at 1.5 lb. 80 W per acre and later increased to 3.0 lb. 80 W per acre). Unusually heavy rains in late August and September, in addition to mechanical difficulties with the sprayer, prevented good protection of B plot late in the season.

Inoculations were made during the evening of July 21 using a mixed zoospore-sporangial suspension of Race 1,2,3,4 of P. infestans (W.V. isolate 167). Inoculum was produced both on lima bean agar slants and potato tuber slices. Release of zoospores was only moderate after incubation for 2 hours at 15° C. This inoculum was applied with hand atomizers to approximately 5 percent of the plants in the inoculator rows only. Prior to inoculation, a natural dew had formed and the air temperature was 23° C.

For the following 10 days, nearly optimal weather conditions favoring the development of the pathogen prevailed, i.e., warm humid days and cool nights accompanied by heavy dews which lasted well into the next morning. Frequent rains also occurred throughout the test period. "Blight spots" appeared on inoculated plants July 25th. The first evaluations were made 10 days later, August 4. At this time, Kennebec, Katahdin, and Irish Cobbler were 50, 75, and 80 percent defoliated, respectively. Plants were evaluated weekly through September 1 according to the following scale: 0 = no late blight, 5 = plants dead from late blight.

Results. The results of our study showed no apparent association between multigenic resistance to P. infestans and glycoalkaloid levels in tuber and leaf tissues, West Virginia Table 1. Several of the highly susceptible clones had very high levels of total glycoalkaloid (TGA), especially in the leaf tissues, while some of the more resistant clones were lower. There was an association between TGA in tubers and leaves. Our results provide evidence that relatively high multigenic resistance is not necessarily accompanied by correspondingly high levels of TGA, and that it should be possible to select blight-resistant clones without high TGA levels.

West Virginia Table 2 gives the results of our evaluation of selected components of multigenic resistance. This type of resistance is highly correlated with smaller lesions, narrower sporulating annuli, and fewer numbers of spores (Table 2). As expected, a negative relationship occurred between yield and disease index. Clone B6028-WV6 has demonstrated a high level of multigenic resistance for several years of testing in Maine and West Virginia. The clone also performed well in the Toluca Valley of Mexico (3+). The component evaluation provided a good profile of the nature of its resistance, while the greatest number of spores were found on Kennebec (R-1).

West Virginia Table 3 gives the mean yield in pounds of U.S. No. 1 tubers per 25-ft. of row for both the protected and unprotected plots. Unusually heavy precipitation throughout the test period, accompanied by several floodings of the plots, were at least partially responsible for the low yields. Kennebec and Irish Cobbler, under more normal conditions, are capable of producing more typical yields of 200 to 250 cwt/A. A 25-ft. plot should produce 50 pounds of U.S. No. 1 tubers to approximate this yield.

West Virginia Table 1. Late blight readings and glycoalkaloid contents of the leaves and tubers of 15 clones from the 1972, West Virginia blight test.

Clone	Field Index ^{1/}	Glycoalkaloid Content (mg/100 g fresh wt)	
		Tubers ^{2/}	Leaves ^{3/}
B6028-WV6	1+ a	2.0	25
B6960-WV2	2- ab	3.0	78
B6960-WV5	2- ab	2.2	51
B6039-WV6	2+ bc	8.2	119
B6928-WV2	2+ bc	2.2	48
B6960-WV4	2+ bc	1.3	56
B6992A-WV8	3- cd	11.1	132
B3720-WV4	3- cd	4.1	87
B6039-WV2	3- cd	9.2	271
B6981-WV4	3 de	9.8	183
Katahdin	4- e	4.8	82
Kennebec	4- e	4.6	101
B6975-WV1	4- e	0.7	50
Irish Cobbler	4+ f	3.2	36
B6981-WV3	4+ f	5.6	114

^{1/}Means of five readings, means not followed by same letter are not significantly different at the 5% level-Duncan Multiple Range test.

Clones ranked from most resistant to most susceptible.

^{2/}Means of two, 6 tuber samples. TGA sampling error = 0.68.

^{3/}Means of 4, 5 g leaf samples. TGA sampling error = 14.3.

West Virginia Table 2. Components of multigenic resistance in selected clones from the 1972 West Virginia late blight test.

Clone	Lesion Area in (CM) ²	Width of sporulating annulus ² / in mm	No. of Spores $\times 10^{-4}$	Yield ⁴ / 3/	Field Index ⁵ / 4/
B6928-WV2	6.72	4.1	4.1	19.9	2+
B6028-WV6	4.34	0.0	2.8	18.6	2
B6960-WV2	6.48	0.8	1.8	17.3	3
B6960-WV5	5.40	0.9	1.5	15.6	3
B6975-WV1	9.75	7.1	6.3	13.6	4
B6039-WV2	7.4	2.9	2.9	13.1	3+
Kennebec	10.36	6.5	8.7	13.0	4+
B6981-WV3	9.9	9.4	8.1	11.9	4
B6039-WV6	5.9	3.0	3.0	11.5	3+
BR5991-WV25	9.45	3.8	4.9	9.2	4-
LSD.05				1.03	
.01				1.36	

- 1/Mean of readings, lesion diameter compared to sporulating annulus, $r = 89$.
2/Mean of ten readings, lesion diameter compared to number of spores, $r = 0.916$.
3/Mean of ten readings, sporulating annulus compared to number of spores, $r = 0.916$.
4/Mean of 5 replications, yield given in pounds of U.S. No. 1 tubers per 25' row. $F = 7.61$.
5/Disease reading, means of 5 replications of 30 plants each taken on 8-16-72. Rating based on a scale of 1 to 5: 1 = no blight, 5 = plants dead.

West Virginia Table 3. Yield and late blight index of 28 potato clones from the 1972 West Virginia late blight test.

Clone	Protected		Unprotected	
	Yield ^{1/}	Disease Index ^{2/}	Yield	Disease Index
Katahdin	13.4	4	9.1	5-
Kennebec	17.0	4-	13.0	4+
I. Cobbler	14.7	4+	13.0	5-
B3720-WV4	20.5	2-	12.6	3+
B5662-WV4	23.1	1+	16.4	3-
B5662-WV13	28.4	2-	20.4	3+
B5670-WV1	28.4	3	16.0	4+
BR5991-WV25	16.9	2+	9.2	4-
B6038-WV3	19.3	2-	14.7	3-
B6039-WV2	13.9	2+	13.1	3+
B6039-WV6	19.2	2	11.5	3+
B6086-WV21	26.1	2	17.0	3+
B6928-WV2	31.8	3-	19.9	2+
B6928-WV4	16.4	5-	13.4	5
B6028-WV6	18.6	1	18.6	2
B6935-WV2	25.4	3-	15.2	4+
B6960-WV2	26.7	1+	17.3	3
B6960-WV4	33.6	1	16.2	4
B6960-WV5	19.5	2-	15.6	3
B6964-WV3	22.5	3-	10.7	4+
B6975-WV1	23.6	3	13.6	4
B6975-WV2	31.9	1+	18.1	3
B6981-WV3	16.5	4	11.9	4
B6981-WV4	21.6	3+	14.7	3-
B6988-WV5	40.5	2-	21.0	3+
B6988-WV15	35.0	2+	16.5	4
B6992A-WV8	19.9	2	15.2	4
R. Rural	15.4	4	10.3	5-
LSD.05			1.03	
.01			1.36	

^{1/}Yield expressed as mean number of pounds of U.S. #1/25' row. F = 7.6114.

^{2/}Late Blight readings 8-16-72. 0 = no blight, 5 = plants dead from late blight.

WISCONSIN

P. R. Rowe and R. W. Ruhde

Genetics and Cytogenetics of the Tuber-Bearing Solanum Species (Cooperative ARS, USDA and Wisconsin Station)

Crossability of *S. stoloniferum*

The tetraploid clones produced by crossing the original progeny (which are hexaploid) from sto x Tbr crosses with diploid Tbr clones were crossed with sto and Tbr. No seed was set in crosses with sto, 60 seeds per fruit were set in crosses with 4X Tbr, and 1 seed per fruit was set in crosses to 2X Tbr. Thus, after one backcross to Tbr, the hybrids have a crossability pattern similar to tetraploid Tuberosum and not like sto even though they should have at least one set of sto chromosomes.

If it were necessary to use a bridge cross to utilize the germplasm of sto, *S. polytrichon*, another tetraploid species from Mexico, appears to be suitable. It crosses well with sto and tetraploid Tbr, and the crosses of the hybrids set seed very well. Chc, as the figures indicate, does not work.

(<u>sto</u> x <u>plt</u>) x (<u>plt</u> x Tbr)	40-80 seeds/fruit
(<u>sto</u> x <u>chc</u>) x (<u>chc</u> x Tbr)	no seed set

Genetic Markers

The inheritance of three traits was studied in progenies from crosses between the interspecific aneuploids and established marker gene stocks. "Pigmented whorl" (Pw) was determined to be due to a single dominant gene linked to the already established F Ow I B linkage group. A preliminary genetic map was established as F Ow Pw I with the map distance between the genes being 7, 3 and 8 units, respectively. "Under-leaf pigmentation (Ul)" also was controlled by a single dominant gene but independent of any linkage group. The "split stigma" characteristic which was frequently found among the aneuploids produced from interspecific triploid-diploid crosses was found to be unrelated to the aneuploid nature of these plants. It occurred as a result of genes which are prevalent in the diploid species, *S. berthaultii*. A two loci hypothesis is proposed as the mode of inheritance with the mutant characteristic being expressed when the recessive allele is homozygous at one or both loci.

Clones with known genotypes are available for the genes: P, R, F, I, li^{SP}, Ac, A, Pw, Ow, Ul, B, df and L. Other clones are available that have a known breeding behavior for traits that are not so well understood. These traits include pigmented stigma, split stigma, pigmented pollen, pigmented anther, variegated flower, yellow tuber flesh, anthocyanin development in tuber flesh, tuber shape, verrucose berry, and one or two dwarf mutants. New variation that was observed this year included: pigmented receptacle, pigment on outer ovary wall, and various patterns of pigmentation in flowers.

Development of trisomics

One of the most important, and yet difficult, steps in establishing a trisomic series is to identify the particular extra chromosome. The majority of the extra chromosomes that have been identified, especially among the trisomics, are isochromosomes.

Secondary trisomics can be used to associate genes with chromosomes, but more factors have to be considered in calculating expected genetic ratios than with primary trisomics. Consideration has to be given to the genetic output to be expected with and without crossing over, from non-random pairing, from internal crossing over in a heterozygous isochromosome, and from non-random segregation of the isochromosome. To establish trisomic ratios with any degree of confidence, one must know the genotype of the aneuploid and the expected pairing and distribution of the chromosomes.

Chromosome pairing at metaphase I seems to vary between genotypes. Observations of 24 intraspecific chc trisomics and 36 interspecific trisomics showed that cells with 12 bivalents and one univalent were the most frequent. Cells with one trivalent and 11 bivalents occurred 30% of the time. Other combinations made up about 10% of the cells that were observed. However, individual clones differed in their pattern of pairing.

Some preliminary attempts have been made to detect distorted ratios in crosses between trisomics and tester stocks. Several tests will be required to substantiate any suspected gene-chromosome association.

WYOMING

K. E. Bohnenblust

The potato variety trials in Wyoming were planted at Torrington, Laramie, Powell, and Afton in 1972. The Powell nursery was not harvested for yield because of a very poor stand.

The highest yield at Torrington was 329.1 cwt/A of the variety Wyred. The yield of Wyred was significantly greater than that of any other entry. La Rouge and Red La Soda were second and third with identical yields of 285.6 cwt/A. Surchip yielded 283.7. The next in rank were two experimental lines from the breeding project in Alaska.

The three entries from Alaska were highest in specific gravity at Torrington. The readings were Ak. 5-3 at 1.090, Ak. 35 at 1.084, and Alaska Frostless at 1.083.

The best chip color at Torrington was a No. 3 which was shared by six entries. These were Ak. 35, Hi-Plains, Monona, New Haig, Norchip, and Shurchip.

At Laramie, the total yield of Wyred was significantly greater than any other variety. The next highest yield obtained was 228.1 cwt/A of Cascade. The yield of Cascade was not significantly different from that of W721, Red La Soda, W701, La Rouge, and New Haig. The specific gravity readings at Laramie were generally high. Alaska Frostless had the highest specific gravity, 1.098. La Rouge and Russet Burbank each had 1.095. New Haig was next at 1.094, and Cascade had 1.092. The best chip color (No. 3) was common to Shurchip, Monona, Norchip, and Hi-Plains.

A nursery was planted at Afton where the elevation is above 6000 feet, and the average number of days between the last spring frost and the first fall frost is 18. The plots were not large enough to get an accurate estimate of yield but adequate to encourage us to repeat the experiment on a larger scale in the future. The tubers were generally small which may be due to the short growing season. The surface of most of the tubers was roughened by what appeared to be insect damage.

Wyoming Table 1. Potato variety trial, Torrington, 1972.^{1/}

Variety	Total yield cwt/acre	% No.1	Specific Gravity	Chip Color
Wyred	329.1	83	1.074	7
La Rouge	285.6	86	1.073	6
Red La Soda	285.6	87	1.072	6
Shurchip	283.7	94	1.079	3
Ak. 5-3	275.3	86	1.090	5
Ak. 35	271.0	89	1.084	3
Russet Burbank	268.0	81	1.081	5
New Haig	267.4	83	1.079	3
W705	265.6	87	1.071	4
W701	260.8	89	1.078	4
W721	251.7	81	1.072	5
Norgold	242.0	78	1.074	8
Norchip	234.7	86	1.078	3
Monona	208.7	87	1.075	3
W704	197.2	85	1.073	6
Ak. Frostless	186.3	73	1.083	8
Hi-Plains	184.5	78	1.077	3
Overall Mean	252.8			
LSD .05	38.1			

^{1/} Date planted - May 25.
 Spacing - rows 36 inches apart, hills 12 inches apart.
 Planted in 1-row plots, 30 ft long.
 Previous crop - alfalfa
 Fertilizer - none
 Irrigation - furrow
 Date of killing frost - September 23.
 Date harvested - October 3.
 Specific gravity obtained - October 26, potato hydrometer
 Chipping date - November 3. PCII color standard.

Wyoming Table 2. Potato variety trial, Laramie, 1972.^{1/}

Variety	Total yield cwt/acre	% No. 1	Specific Gravity	Chip Color
Wyred	268.6	94	1.083	9
Cascade	228.1	91	1.092	5
W721	220.2	94	1.086	7
Red La Soda	217.2	94	1.087	6
W701	212.4	91	1.087	5
La Rouge	203.3	88	1.095	6
New Haig	192.4	97	1.093	4
Shurchip	173.6	93	1.086	3
W704	165.2	85	1.090	6
Monona	145.8	92	1.087	3
Norchip	144.6	85	1.091	3
Russet Burbank	144.0	68	1.095	5
Norgold	131.3	78	1.086	8
Hi-Plains	131.3	80	1.090	3
Ak. Frostless	99.8	75	1.098	6
Overmean	178.5			
LSD _{.05}	50.6			

^{1/} Date planted - May 30.
 Spacing - rows 36 inches apart, hills 12 inches apart.
 Planted in 1-row plots, 30 ft long.
 Previous crop - alfalfa
 Fertilizer - none
 Irrigation - furrow
 Date of killing frost - September 18.
 Date harvested - September 22.
 Specific gravity obtained - October 26.
 Chipping date - November 9. PCII color standard.

Wyoming Table 3. Potato variety yield trial, Afton, 1972.^{1/}

Variety	Total yield cwt/acre	Specific Gravity
Red La Soda	105.3	1.079
New Haig	74.8	1.083
Ak. Frostless	69.0	1.091
Norgold Russet	61.7	1.078
Overall Mean	77.7	
LSD _{.05}	49.4	

^{1/} Date planted - May 30.
 Spacing - rows 36 inches apart, hills 12 inches apart.
 Planted in 1-row plots, 5 ft long.
 Previous crop - Furrow.
 Fertilizer - none.
 Irrigation - furrow
 Date of killing frost - September 21.
 Date harvested - September 25.
 Specific gravity obtained - October 12, potato hydrometer.

